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# SUPPLEMENT

## TO BULLETIN OF THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

An Act of the Fifty-eighth Legislature of the State of Texas changed the name of The Agricultural and Mechanical College of Texas to Texas A&M University effective August 23, 1963.

BULLETIN
OF THE
AGRICULTURAL AND MECHANICAL
COLLEGE OF TEXAS

Sixth Series, Vol. 10 February 1, 1963 No. 1

# UNDERGRADUATE CATALOGUE ISSUE

## RECORD OF SESSION 1962-63

## ANNOUNCEMENTS FOR THE SESSION 1963-64

1876

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COLLEGE STATION, TEXAS

Published bi-monthly by the Agricultural and Mechanical College of Texas
Second class postage paid at College Station, Texas

# ACADEMIC
# 1963

## SUMMER SESSION 1963

### JUNE

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### JULY

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### AUGUST

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**June 3, Monday**
8 a.m. to 12 noon, registration for the first term.

**June 4, Tuesday**
7 a.m., beginning of classes.

**June 6, Thursday**
Last day for enrolling in the College for the first term and for making changes in registration.

**July 4, Thursday**
A holiday.

**July 12, Friday**
First term final examinations.

**July 15, Monday**
8 a.m. to 12 noon, registration for the second term.

**July 16, Tuesday**
7 a.m., beginning of classes.

**July 18, Thursday**
Last day for enrolling in the College for the second term and for making changes in registration.

**August 23, Friday**
Second term final examinations.

## FALL SEMESTER 1963

### SEPTEMBER

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### OCTOBER

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### NOVEMBER

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**September 11, Wednesday**
New freshmen report to campus.

**September 11-12, Wednesday-Thursday**
New Student Program.

**September 12-13, Thursday-Friday**
Thursday, 1 p.m. to 5 p.m., and Friday, 8 a.m. to 12 noon, registration of new freshmen.

**September 13-14, Friday-Saturday**
Friday, 1 p.m. to 5 p.m., and Saturday, 8 a.m. to 5 p.m., registration for all other students.

**September 16, Monday**
8 a.m., beginning of classes.

**September 21, Saturday**
Last day for enrolling in the College for the Fall Semester or for adding new courses.

**September 25, Wednesday**
Last day for dropping courses with no grade.

**November 11, Monday**
Mid-semester grade reports.

**November 28-December 1, Thursday-Sunday, inclusive**
Thanksgiving holidays.

# CALENDAR 1964

**December 21, Saturday**
Noon, beginning of Christmas recess.

**January 6, 1964, Monday**
End of Christmas recess, 8 a.m.

**January 18, Saturday**
Commencement.

**January 20, Monday**
First day of semester examinations.

**January 25, Saturday**
Last day of semester examinations.

### DECEMBER

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## SPRING SEMESTER 1964

**January 29, Wednesday**
New freshmen report to campus.

**January 31, Friday**
8 a.m. to 12 noon, registration of new freshmen.

**January 31-February 1, Friday-Saturday**
Friday, 1 p.m. to 5 p.m., and Saturday, 8 a.m. to 5 p.m., registration of all other students.

**February 3, Monday**
Beginning of classes.

**February 8, Saturday**
Last day for enrolling in the College for the Spring Semester or for adding new courses.

**February 12, Wednesday**
Last day for dropping courses with no grade.

**March 23, Monday**
Mid-semester grade reports.

**March 25, Wednesday**
5 p.m., beginning of Spring recess.

**March 31, Tuesday**
8 a.m., end of Spring recess.

**May 23, Saturday**
Commencement and Final Review

**May 25, Monday**
First day of semester examinations.

**May 30, Saturday**
Last day of semester examinations.

### JANUARY

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### FEBRUARY

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### MARCH

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### APRIL

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### MAY

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## The Texas Agricultural and Mechanical College System

Composed of all colleges, agencies and services under the supervision of the Board of Directors of the Agricultural and Mechanical College of Texas, including:

- The Agricultural and Mechanical College of Texas
    - The Texas Agricultural Experiment Station
    - The Texas Agricultural Extension Service
    - The Texas Engineering Experiment Station
    - The Texas Engineering Extension Service
    - The Texas Transportation Institute
- The Arlington State College
- The Tarleton State College
- The Prairie View Agricultural and Mechanical College
- The Texas Forest Service

## Board of Directors

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| H. C. Heldenfels, *General Contractor* | Corpus Christi |
| Clyde H. Wells, *Rancher* | Granbury |
| A. P. Beutel, *Industrial Executive* | Lake Jackson |
| L. F. Peterson, *Petroleum Consultant* | Fort Worth |
| Gardiner Symonds, *Corporation Executive* | Houston |

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| M. T. Harrington | *Chancellor* |
| John C. Calhoun, Jr. | *Vice Chancellor for Development* |
| W. C. Freeman | *Vice Chancellor for Fiscal Affairs* |
| Normand P. DuBeau | *Director of Information and Publications* |
| C. D. Wells | *Manager of Physical Plants* |

# The Agricultural and Mechanical College of Texas

## Administrative Officers

| | |
|---|---|
| Earl Rudder, B.S., LL.D. | *President* |
| Andrew D. Suttle,* Ph.D. | *Vice President for Research* |
| Wayne C. Hall, Ph.D. | *Dean of Graduate Studies* |
| W. J. Graff, Ph.D. | *Dean of Instruction* |
| R. E. Patterson, Ph.D. | *Dean of Agriculture and Director of Agricultural Experiment Station* |
| G. M. Watkins, Ph.D. | *Director of Agricultural Instruction* |
| John E. Hutchison, M.Ed. | *Director of Agricultural Extension Service* |
| Frank W. R. Hubert, Ph.D. | *Dean of Arts and Sciences* |
| Fred J. Benson, M.S. | *Dean of Engineering and Director of Texas Engineering Experiment Station* |
| Harold D. Bearden, M.A. | *Director of Engineering Extension Service* |
| Alvin A. Price, D.V.M., M.S., | *Dean of Veterinary Medicine* |
| Bennett M. Dodson, B.S. | *Superintendent, Texas Maritime Academy* |
| James P. Hannigan, B.S. | *Dean of Students* |
| H. Lloyd Heaton, M.S. | *Director of Admissions and Registrar* |
| Thomas D. Cherry, M.S. | *Director of Business Affairs* |
| Charles A. Roeber, B.A., B.B.A. | *Business Manager* |

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*On leave of absence from 10-1-62 to 9-30-63.

Simmang, Clifford Max, Professor of Mechanical Engineering. (1938, 1957)

Squire, Charles F., Associate Dean of the School of Arts and Sciences and Professor of Physics. (1962)

Starkey, James F., Colonel, Professor of Air Science. (1962)

Stevenson, Robert M., Professor of Business Administration. (1947, 1961)

Street, William Ezra, Professor of Engineering Graphics. (1941)

Suttle, Andrew D., Jr.,* Vice President for Research and Professor of Chemistry. (1962)

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology. (1947, 1953)

Tishler, Carl Edward, Professor of Health and Physical Education. (1941, 1947)

Trogdon, William O., Professor of Agronomy. (1958)

Turk, Richard Duncan, Professor of Veterinary Parasitology. (1944)

Wainerdi, Richard Elliott, Associate Dean of Engineering. (1957, 1959)

Watkins, Gustav McKee, Director of Agricultural Instruction. (1949, 1960)

Whiting, Robert Louis, Professor of Petroleum Engineering. (1946, 1954)

Woolket, Joseph John, Professor of Modern Languages. (1925, 1945)

Wright, Samuel Robert, Professor of Civil Engineering. (1923, 1946)

Zinn, Bennie A., Director of the Department of Student Affairs. (1945, 1954)

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*On leave of absence from 10-1-62 to 9-30-63.

## GENERAL FACULTY

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Abbott, John Paul, Distinguished Professor of English. (1926, 1956)
B.A., Vanderbilt, 1925; Ph.D., Iowa, 1939.

Adamson, Arthur Douglas, Professor of Health and Physical Education. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1944.

Adkisson, Perry L., Associate Professor of Entomology. (1958)
B.S., Arkansas, 1950; M.S., 1954; Ph.D., Kansas State College, 1956.

Aldred, William Hughes, Assistant Professor of Agricultural Engineering. (1953, 1957)
B.S., Georgia, 1951; M.S., Agricultural and Mechanical College of Texas, 1956.

Alexander, Robert Benjamin, Associate Professor of Chemistry. (1952, 1959)
B.A., Baylor, 1945; M.A., 1946; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Alter, Alan Brian, Assistant Professor of Mechanical Engineering. (1949, 1952)
B.S., Pittsburgh, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Reg. Prof. Engr.

Amason, Robert Daniel, Assistant Professor of Business Administration. (1960)
B.B.A., Agricultural and Mechanical College of Texas, 1951; M.B.A., 1958.

Ames, Robert Theodore, Instructor in Business Administration. (1961)
B.B.A., Agricultural and Mechanical College of Texas, 1960.

Amyx, James William, Professor of Petroleum Engineering. (1948, 1959)
B.S., Agricultural and Mechanical College of Texas, 1946; M.Eng., 1956; Reg. Prof. Engr.

Anderson, Clifton Einar, Instructor in Government. (1962)
B.S., Wisconsin, 1947; M.A., California, 1954.

Anderson, Donald T., Captain, Assistant Professor of Air Science. (1962)
B.B.A., Agricultural and Mechanical College of Texas, 1959.

Anderson, John Quincy, Professor of English and Head of Department. (1953, 1962)
A.B., Oklahoma Agricultural and Mechanical College, 1939; M.A., Louisiana State, 1948; Ph.D., North Carolina, 1952.

Andrews, Paul Milton, Associate Professor of Health and Physical Education. (1943, 1951)
B.S., Sul Ross State Teachers College, 1934; M.Ed., Agricultural and Mechanical College of Texas, 1945.

Angino, Ernest Edward, Assistant Professor of Oceanography. (1962)
B.S., Lehigh, 1954; M.S., Kansas, 1958; Ph.D., 1961.

Arango, Ergasto Ramon, Instructor in Government. (1960)
B.S., Florida, 1951; M.A., Columbia, 1954; Ph.D., Florida, 1961.

Archer, Stanley Louis, Instructor in English. (1962)
B.A., Agricultural and Mechanical College of Texas, 1959; M.A., Mississippi, 1961.

Armendariz, Efraim Pacillas, Instructor in Mathematics. (1962)
B.A., Agricultural and Mechanical College of Texas, 1960; M.S., 1962.

Ashcraft, Allan Coleman, Assistant Professor of History. (1956, 1960)
B.A., Agricultural and Mechanical College of Texas, 1950; M.A., Columbia, 1951; Ph.D., 1960.

Ashworth, Lee J., Jr., Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., California, 1951; M.S., 1954; Ph.D., 1958.

Atkins, Irvin Milburn, Agronomist (Agricultural Research Service, USDA, cooperating.) (1939, 1954)
B.S., Kansas State College, 1928; M.S., 1936; Ph.D., Minnesota, 1945.

Atkinson, Robert Leon, Assistant Professor of Poultry Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950; Ph.D., California, 1958.

Atwell, Buddy Houston, Instructor in Geophysics. (1962)
B.S., Agricultural and Mechanical College of Texas, 1960.

Axford, Roy Arthur, Professor of Nuclear Engineering. (1960, 1962)
A.B., Williams College, 1950; S.B., Massachusetts Institute of Technology, 1952; S.M., 1955; Sc.D., 1958.

Bailey, Kenneth Ralph, Assistant Professor of Mathematics. (1946, 1954)
B.A., Texas, 1937; M.A., 1941.

Baldauf, Richard John, Associate Professor of Wildlife Management. (1952, 1959)
B.S., Albright College, 1949; M.S., Agricultural and Mechanical College of Texas, 1951; Ph.D., 1956.

Ball, Billie Joe, Associate Professor of Electrical Engineering. (1959, 1962)
B.S., Mississippi State, 1956; M.S., 1959; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Ballinger, Richard Henry, Professor of English. (1954, 1957)
B.A., Texas, 1936; M.A., 1936; Ph.D., Harvard, 1953.

Banks, William Carl, Professor of Veterinary Medicine and Surgery. (1941, 1955)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Bardell, North Bruce, Jr., Assistant Professor of Engineering Graphics. (1953, 1957)
B.S., Agricultural and Mechanical College of Texas, 1953; M.Eng., 1962.

Barker, Donald Gene, Assistant Professor of Psychology. (1959)
B.A., Baylor, 1952; M.A., 1954.

Barker, Palmer Winfield, Associate Professor of Physics. (1946, 1949)
B.S., Missouri, 1932; M.A., 1933.

Barnard, Herbert Marvin, Assistant Professor of Electrical Engineering. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1955.
(On leave of absence from 9-1-62 to 8-31-63.)

Barnes, Jack Allan, Instructor in Physics. (1962)
B.A., McMurry College, 1960.

Barzak, Robert William, Assistant Dean of Graduate Studies and Associate Professor of English. (1955, 1962)
B.A., Agricultural and Mechanical College of Texas, 1949; M.A., Illinois, 1951; Ph.D., 1959.

Bashaw, Elexis C., Geneticist of Agricultural Research Service, USDA. (1951, 1955)
B.S., Purdue, 1947; M.S., 1948; Ph.D., Agricultural and Mechanical College of Texas, 1954.

Bass, Dallas Doolin, Instructor in Animal Husbandry. (1962)
B.S., Florida, 1961; M.S., 1962.

Bassett, Harold Sydney, Assistant Professor of Economics. (1962)
B.A., Agricultural and Mechanical College of Texas, 1956; M.A., 1958.

Basye, Robert Eugene, Professor of Mathematics. (1940, 1952)
B.A., Missouri, 1929; M.A., Princeton, 1931; Ph.D., Texas, 1933.

Bathke, William Leonard, Instructor in Agricultural Engineering. (1962)
B.S., Minnesota, 1959.

Baty, James Bernard, Professor of Civil Engineering. (1948, 1950)
B.S., Agricultural and Mechanical College of Texas, 1925; M.C.E., Cornell, 1950; Reg. Prof. Engr.

Baugh, Orville Lee, Assistant Professor of Mathematics. (1956, 1962)
B.S., North Texas State College, 1941; M.S., 1951.
(Deceased October 31, 1962)

Bayliss, Garland Erastus, Assistant Professor of History. (1956, 1958)
B.S., Arkansas, 1951; M.A., Texas, 1953.

Beachell, Henry M., Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Nebraska, 1930; M.S., Kansas State College, 1933.

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Beasley, Joseph Noble, Associate Professor of Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1949; M.S., 1956.
(On leave of absence from 9-1-62 to 8-31-63.)

Bebout, Harley, Associate Professor of Agricultural Economics. (1939, 1959)
B.S., Missouri, 1925; M.S., Agricultural and Mechanical College of Texas, 1939.

Beck, Louis Marvin, Assistant Professor of Sociology. (1962)
B.A., Blackburn College, 1955; M.A., Louisiana State, 1960.

Beckham, John Blair, Associate Professor of Chemistry. (1946, 1958)
A.B., Daniel Baker College, 1936; B.S., 1937; M.S., Agricultural and Mechanical College of Texas, 1950.

Beckham, Paul Miles, Instructor in Mechanical Engineering. (1960)
B.S., United States Naval Academy, 1954; M.S., Agricultural and Mechanical College of Texas, 1961.

Bell, Rurel Roger, Associate Professor of Veterinary Parasitology. (1952, 1958)
D.V.M., Georgia, 1952; M.S., Agricultural and Mechanical College of Texas, 1955.

Bell, Wiley Wayne, Captain, Assistant Professor of Military Science (1961)
B.S., Oklahoma State, 1953.

Bennett, Alvin Lowell, Associate Professor of English. (1954, 1957)
B.A., Texas, 1927; M.A., Washington, 1931; Ph.D., Texas, 1952.

Benson, Fred Jacob, Dean of Engineering, Administrator of the Texas Engineering Experiment Station, and Professor of Civil Engineering. (1937, 1962)
B.S., Kansas State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1936; Reg. Prof. Engr.

Benton, Wilbourn Eugene, Professor of Government. (1957, 1962)
B.A., Texas Technological College, 1939; M.A., 1941; Ph.D., Texas, 1948.

Bertrand, Clint Albert, Assistant Professor of Industrial Education. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1953.

Bier, Harold Dean, Instructor in Chemistry. (1962)
B.S., West Texas State College, 1958; M.S., Agricultural and Mechanical College of Texas, 1962.

Bird, Luther Smith, Associate Professor of Plant Physiology and Pathology. (1951, 1959)
B.S., Clemson College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1955.

Bitner, Claude Andrell, Jr., Assistant Professor of Economics. (1959)
B.B.A., Texas, 1950; M.A., 1956.

Blackhurst, Homer T., Professor of Horticulture. (1947, 1950)
A.B., Glenville State Teachers College, 1935; M.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., 1947.

Blank, Horace R., Professor of Geology. (1949, 1953)
B.S., Pennsylvania, 1919; Ph.D., 1924.

Bloodworth, Morris Elkins, Professor of Agronomy. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1953; Ph.D., 1958.

Boehme, Hollis Clyde, Instructor in Physics. (1962)
B.A., Agricultural and Mechanical College of Texas, 1960; M.S., 1961.

Bolinger, T. D., Instructor in Engineering Graphics. (1962)
B.S., Northwestern State College, 1956; M.S., Oklahoma State, 1957.

Bolte, David Endicott, Major, Associate Professor of Military Science. (1962)
B.S., United States Military Academy, 1949.

Boone, James Leroy, Jr., Assistant Professor of Industrial Education. (1952, 1955)
B.S., Agricultural and Mechanical College of Texas, 1947; M.Ed., 1948.

Boone, Robert Leroy, Assistant Professor of Liberal Arts. (1960, 1961)
B.S., Houston, 1951; M.A., Sam Houston State Teachers College, 1954.

Boriskie, Ben Bernard, Associate Professor of Physics. (1941, 1959)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1948.

Boswell, James Louis, Instructor in Biology. (1961)
B.S., East Central State (Oklahoma), 1936; M.S., Oklahoma, 1938.

Branson, Robert Earl, Professor of Agricultural Economics and Sociology. (1955, 1958)
B.S., Southern Methodist, 1941; M.P.A., Harvard, 1948; M.A., 1949; Ph.D., 1954.

Brazzel, James Roland, Professor of Entomology. (1957, 1961)
B.S., Louisiana State, 1951; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Breitenkamp, Edward Carlton, Associate Professor of Modern Languages. (1953, 1956)
B.A., Drake, 1936; M.A., 1938; Ph.D., Iowa, 1951.

Brewer, Burns W., Professor of Mathematics. (1938, 1957)
A.B., Missouri, 1935; A.M., 1936; Ph.D., 1938.

Bridges, Charles Hubert, Professor of Veterinary Pathology and Head of Department. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1954; Ph.D., 1957.

Brigham, Raymond D., Agronomist. (1957)
B.S., Texas Technological College, 1950; M.S., Iowa State, 1952; Ph.D., 1957.

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)
B.S., Agricultural and Mechanical College of Texas, 1921; M.S., Michigan State College, 1931.

Brooks, Weston Terrell, Instructor in Industrial Education. (1962)
B.S., Sam Houston State Teachers College, 1961; M.Ed., 1962.

Brown, David W., Assistant to the Dean of Agriculture and Associate Professor of Agricultural Economics. (1962)
B.S., Connecticut, 1953; M.S., Cornell, 1954; Ph.D., Iowa State College, 1956.

Brown, Herman Dale, Instructor in Agricultural Education. (1962)
B.S., Agricultural and Mechanical College of Texas, 1953; M.Ed., 1962.

Brown, Murray Allison, Associate Professor of Dairy Science. (1955, 1962)
B.S., Michigan State College, 1950; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Brown, Meta Suche, Professor of Agronomy. (1940, 1955)
B.A., Texas, 1931; M.A., 1933; Ph.D., 1935.

Brown, Stewart Ellsworth, Instructor in Mechanical Engineering. (1951)

Brown, Sidney Overton, Professor of Biology. (1936, 1949)
B.A., Texas, 1932; Ph.D., 1936.

Brundidge, Kenneth Cloud, Associate Professor of Meteorology. (1955, 1962)
B.A., Chicago, 1952; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Buchanan, Spencer Jennings, Professor of Civil Engineering. (1946)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., Massachusetts Institute of Technology, 1931; C.E., Agricultural and Mechanical College of Texas, 1948; Reg. Prof. Engr.

Bullinger, Clarence Edward, Lecturer in Industrial Engineering. (1962)
B.S., Pennsylvania State, 1922; M.S., 1927; Reg. Prof. Engr.

Burgess, Archie Rostron, Professor of Industrial Engineering and Head of Department. (1948, 1951)
B.S., Washington, 1932; M.S., 1938; Reg. Prof. Engr.

Burke, Horace Reagan, Assistant Professor of Entomology. (1958)
B.S., Sam Houston State Teachers College, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., 1959.

Burns, Edward Eugene, Associate Professor of Horticulture. (1956, 1959)
B.S., Purdue, 1950; M.S., 1952; Ph.D., 1956.

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology and Head of Department. (1926, 1935)
B.S., Agricultural and Mechanical College of Texas, 1923; D.V.M., 1926.

Burroughs, Albert Lawrence, Serologist of Department of Veterinary Microbiology. (1954, 1957)
B.S., Wyoming, 1938; M.S., Montana State College, 1941; Ph.D., California, 1946.

Butler, Marvin Harold, Assistant Professor of Economics. (1948)
A.B., McKendree College, 1940; M.A., Illinois, 1948.

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry and Head of Department. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947; Ph.D., Michigan State College, 1953.

Byrns, Robert Eugene, Lieutenant Colonel, Associate Professor of Military Science. (1958)
B.A., Colorado State College of Education, 1933.

Caddess, James Harvey, Associate Professor of Mechanical Engineering. (1940, 1953)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1934; Reg. Prof. Engr.

Cain, Roy Edward, Assistant Professor of English. (1956, 1960)
B.A., North Texas State College, 1953; M.A., 1954.

Calaway, Paul Kenneth, Professor of Chemistry and Head of Department. (1957)
B.A., Arkansas College, 1931; M.S., Georgia Institute of Technology, 1933; Ph.D., Texas, 1938.

Calhoun, John C., Jr., Vice Chancellor for Development and Professor of Petroleum Engineering. (1955, 1960)
B.S., Pennsylvania State College, 1937; M.S., 1941; Ph.D., 1946; Reg. Prof. Engr.

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery and Head of Department. (1958)
B.S., Agricultural and Mechanical College of Texas, 1941; D.V.M., 1949.

Camp, Bennie Joe, Associate Professor of Biochemistry and Nutrition. (1956, 1960)
B.S., East Texas State Teachers College, 1949; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Cantrell, Wallace Gene, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Carmichael, Horace Hart, Captain, Assistant Professor of Military Science. (1962)
A.B., George Washington, 1959.

Carpenter, Zerle Leon, Assistant Professor of Animal Husbandry. (1962)
B.S., Oklahoma State, 1957; M.S., Wisconsin, 1960; Ph.D., 1962.

Carter, Dilford Campbell, Instructor in Wildlife Management. (1961)
B.S., Southern Methodist, 1956; M.S., 1956; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Cartwright, Thomas Campbell, Professor of Animal Husbandry. (1958)
B.S., Clemson Agricultural College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1954.

Casey, Albert J., Assistant Professor of Psychology. (1962)
B.A., Kansas, 1953; M.A., 1956; Ph.D., 1962.

Chalk, Alfred Franklin, Professor of Economics and Head of Department. (1936, 1956)
B.A., Baylor, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1950.

Chambliss. Kinneth M., Instructor in Industrial Education. (1962)
B.S., Montana State College, 1952; M.Ed., Colorado State, 1962.

Chandler, David Jarrett, Major, Associate Professor of Military Science. (1959, 1961)
B.S., United States Military Academy, 1949.

Cherry, Richard Theodore, Assistant Professor of Business Administration. (1962)
B.A., Agricultural and Mechanical College of Texas, 1951; M.A., Texas, 1959.

Cherry, Thomas Dunnam, Director of Business Affairs. (1962)
B.S., Sam Houston State Teachers College, 1932; M.S., Agricultural and Mechanical College of Texas, 1938.

Chien, Chen Wu, Assistant Professor of Oceanography. (1960)
B.S., Southwest Associated, 1943; M.A., California, 1949; Ph.D., 1959.

Clark, Lewis Edwin, Instructor in Agronomy. (1962)
B.S., Texas Technological College, 1959.

Clark, Robert Alfred, Assistant Professor of Meteorology. (1960, 1961)
B.S., Kansas State, 1948; M.S., Agricultural and Mechanical College of Texas, 1959.

Clark, William Jesse, Assistant Professor of Biology. (1957)
B.S., Utah State Agricultural College, 1950; M.S., 1956; Ph.D., 1958.

Clayton, William Howard, Associate Professor of Oceanography and Research Scientist. (1954, 1961)
B.S., Bucknell, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Cleland, Samuel Miles, Professor of Engineering Graphics. (1941, 1958)
B.A., West Texas State Teachers College, 1931; M.Ed., Agricultural and Mechanical College of Texas, 1940.

Cleveland, Donald Edward, Associate Professor of Civil Engineering and of Industrial Engineering. (1959, 1962)
B.S., Massachusetts Institute of Technology, 1949; M.Eng., Yale, 1959; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Cobb, Lalovee Glenn, Instructor in Meteorology. (1962)
B.A., Louisiana State, 1954.

Cochran, Robert Glenn, Professor of Nuclear Engineering and Head of Department. (1959)
A.B., Indiana, 1948; M.S., 1950; Ph.D., Pennsylvania State, 1957.

Cochrane, John Douglas, Associate Professor of Oceanography. (1956, 1962)
B.A., University of California at Los Angeles, 1943; M.S., Scripps Institute of Oceanography, 1948.

Coffey, Lee Clayton, Professor of Agronomy. (1950, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1950; Ph.D., Iowa State, 1954.

Collier, Albert, Director, Galveston Marine Laboratory. (1958)
B.A., Rice Institute, 1933.
(Resigned 10-31-62.)

Collier, Jesse Wilton, Associate Agronomist. (1949, 1960)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1952; Ph.D., Rutgers, 1957.

Cook, Benjamin Davy, Associate Professor of Agricultural Education and Specialist in Extension Training. (1950, 1960)
B.S., Agricultural and Mechanical College of Texas, 1934; M.Ed., 1950; Ph.D., Wisconsin, 1957.

Cook, Elton D., Agronomist of Texas Agricultural Experiment Substation, Temple. (1949, 1952)
B.S., Texas Technological College, 1935; M.S., Kansas State, 1948; Ph.D., Nebraska, 1951.

Coon, Jesse Bryan, Professor of Physics. (1946, 1957)
A.B., Indiana, 1932; M.A., 1935; Ph.D., Chicago, 1949.

Couch, Jack Gary, Instructor in Physics. (1961)
B.S., Utah State, 1958; M.S., Vanderbilt, 1959.

Couch, James Russell, Professor of Biochemistry and Nutrition and of Poultry Science. (1948, 1949)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; Ph.D., Wisconsin, 1948.

Courtney, Harley Macon, Assistant Professor of Business Administration. (1961)
B.B.A., Lamar State College of Technology, 1955; M.B.A., Agricultural and Mechanical College of Texas, 1961.
(On leave of absence from 8-31-62 to 9-1-63.)

CoVan, Jack Phillip, Professor of Industrial Engineering. (1946, 1956)
B.M.E., Ohio State, 1935; B.I.E., 1935; M.S., Illinois, 1942; Reg. Prof. Engr.
(On leave of absence from 2-1-62 to 1-31-64.)

Cover, Sylvia A., Professor, Home Economics Department, Texas Agricultural Experiment Station. (1933, 1949)
B.S., Illinois, 1920; M.A., Missouri, 1929; Ph.D., 1933.

Cox, Sidney Saunders, Assistant Professor of English. (1948, 1952)
B.A., Southwest Texas State Teachers College, 1932; M.A., 1939.

Cozzens, Charles Richard, Instructor in Engineering Graphics. (1962)
B.S., Agricultural and Mechanical College of Texas, 1953; M.Ed., Southwest Texas State College, 1960.

Crawford, Charles William, Professor of Mechanical Engineering. (1919, 1928)
B.S., Agricultural and Mechanical College of Texas, 1919; M.S., 1929; Reg. Prof. Engr.

Crawford, Paul B., Assistant Director of the Texas Petroleum Research Committee and Professor of Petroleum Engineering. (1952, 1962)
B.S., Texas Technological College, 1943; M.S., Texas, 1946; Ph.D., 1949.

Creger, Clarence R., Assistant Professor of Poultry Science. (1962)
B.S., Kansas State, 1955; M.S., 1956; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Creswell, Horace Staley, Assistant Professor of English. (1946, 1951)
B.S., Texas Technological College, 1935; M.A., Texas Christian, 1938.

Crittenden, Elmer Pratt, Assistant Professor of English. (1956)
B.A., Boston, 1939; M.A., Southern Methodist, 1946.

Cronk, Alfred Edward, Professor of Aerospace Engineering and Head of Department. (1956)
B.S., College of St. Thomas, 1937; M.S., Minnesota, 1946; Reg. Prof. Engr.

Crookshank, Herman Robert, Animal Nutritionist for the Department of Biochemistry and Nutrition, USDA. (1959)
B.S., Northeast Missouri State College, 1938; M.S., 1940; Ph.D., Iowa State, 1942.

Crotty, Arnold Eugene, Assistant Professor of Business Administration. (1962)
B.S., Virginia, 1955; M.B.A., 1957; C.P.A., Virginia, 1959.

Crow, Ulrich Wilson, Professional Counselor with Counseling and Testing Center, Assistant Professor. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Educ., 1956.

Dabbs, Jack Autrey, Professor of Modern Languages. (1950, 1959)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1950.

Dahlberg, Frank Iver, Professor of Animal Husbandry. (1936, 1947)
B.S., Agricultural and Mechanical College of Texas, 1925; M.S., Wisconsin, 1930.

Danti, Alfred, Associate Professor of Chemistry. (1961)
B.S., Colorado College, 1954; Ph.D., Massachusetts Institute of Technology, 1958.

Davey, Ralph Hemmings, Jr., Assistant Professor of Engineering Graphics. (1955, 1958)
B.S., United States Military Academy, 1932; M.Eng., Agricultural and Mechanical College of Texas, 1959; Reg. Prof. Engr.

Davich, T. B., Entomologist, United States Department of Agriculture, Cotton Insect Program. (1956)
B.S., Ohio State, 1948; M.S., Wisconsin, 1951; Ph.D., 1953.

Davis, Donald Dwight, Instructor in Mathematics. (1960)
B.S., Michigan State, 1935; M.Ed., Cincinnati, 1950.

Davis, Daniel Rowland, Associate Professor of Sociology. (1935, 1947)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1935.

Davis, Joe Eugene, Colonel, Commandant of the School of Military Sciences. (1930, 1951)
B.S., Agricultural and Mechanical College of Texas, 1930.

Davis, Richard Bratton, Associate Professor of Wildlife Management. (1951, 1959)
B.S., Texas College of Arts and Industries, 1940; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1952.

Davis, Richard Harvey, Jr., Associate Professor of Veterinary Physiology and Pharmacology. (1951, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1956.

Davis, William B., Professor of Wildlife Management and Head of Department. (1937, 1946)
B.A., Chico State Teachers College, 1933; M.A., California, 1936; Ph.D., 1937.

Davison, Richard Read, Assistant Professor of Chemical Engineering. (1958, 1961)
B.S., Texas Technological College, 1949; M.S., Agricultural and Mechanical College of Texas, 1958; Ph.D., 1962.

Decker, John Petty, Assistant Professor of Physics. (1956, 1961)
B.S., Arkansas, 1949; M.S., 1953; Reg. Prof. Engr.

Dehlinger, Peter, Professor of Geophysics. (1954, 1957)
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943; Ph.D., 1950.
(Resigned 10-31-62.)

Deliz, John Donald, Instructor in Modern Languages. (1961)
B.A., California, 1951; M.A., Los Angeles State College, 1955.

Denison, John Scott, Associate Professor of Electrical Engineering. (1949, 1954)
B.S., New Mexico Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Engr.

Denton, Allen Eugene, Jr., Assistant Professor, Counseling and Testing Center. (1951, 1960)
B.A., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1949.

Denton, James Henry, Assistant Professor of Veterinary Medicine and Surgery. (1958, 1961)
D.V.M., Agricultural and Mechanical College of Texas, 1945.

DeWerth, Adolphe Ferdinand, Professor of Floriculture. (1946, 1949)
B.S., Ohio State, 1930; M.S., 1931.

Dieckert, Julius Walter, Associate Professor of Biochemistry and Nutrition. (1960)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., 1955.

Dillingham, Harley Clay, Professor of Electrical Engineering. (1922, 1930)
B.S., Agricultural and Mechanical College of Texas, 1922; A.M., Columbia, 1930; Reg. Prof. Engr.

Dillon, Lawrence Samuel, Professor of Biology. (1948, 1961)
B.S., Pittsburgh, 1933; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1954.

Dobson, William Jackson, Professor of Biology and Professional Counselor, Counseling and Testing Center. (1947, 1960)
B.A., Austin College, 1939; Ph.D., Texas, 1946.

Dodson, Bennett Merritt, Superintendent of Texas Maritime Academy. (1962)
B.S., United States Merchant Marine Academy, Kings Point, New York, 1948; Certificate, United States Naval War College, 1951; Master Mariner.

Donaldson, Joseph, Jr., Lecturer on Architecture. (1956)

Doran, Edwin Beale, Jr., Associate Professor of Geography. (1960)
B.A., Louisiana State, 1938; M.S., 1947; Ph.D., California, 1953.

Dowell, William Merl, Professor of Health and Physical Education. (1942, 1950)
B.S., Sam Houston State Teachers College, 1929; M.A., George Peabody College, 1932.

Dozier, James Hall, Assistant Professor of Business Administration. (1955, 1959)
LL.B., Texas, 1950; M.B.A., Agricultural and Mechanical College of Texas, 1961.

Drake, Flavious Flemings, Major, Associate Professor of Air Science. (1961)
M.B.A., Chicago, 1957.

Drew, Dan D., Assistant Professor of Industrial Engineering. (1960)
B.S., North Texas State College, 1950; M.S., 1951.

Druce, Albert John, Associate Professor of Electrical Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1950.

Dudley, Bobby G., Captain, Assistant Professor of Air Science. (1962)
B.S., St. Louis, 1950; M.A., 1958.

Duller, Nelson Mark, Jr., Associate Professor of Physics. (1953, 1962)
B.S., Agricultural and Mechanical College of Texas, 1948; M.A., Rice Institute, 1951; Ph.D., 1953.

Duncan, Baxter T., Captain, Assistant Professor of Air Science. (1959, 1961)
B.B.A., Sam Houston State Teachers College, 1961.

Duncan, John Thomas, Associate Professor of History. (1943, 1960)
B.A., Simmons College, 1924; M.A., Texas Technological College, 1942.

Dunlap, Wayne Alan, Assistant Professor of Civil Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1955.

Durbin, Leonel Damien, Assistant Professor of Chemical Engineering . (1961)
B.S., Texas College of Arts and Industries, 1957; Ph.D., Rice, 1961.

Earle, James Hubert, Assistant Professor of Engineering Graphics. (1957, 1960)
B.Arch., Agricultural and Mechanical College of Texas, 1955; M.Ed., 1962.

Eckles, William Elam, Assistant Professor of Business Administration. (1960)
B.S., Agricultural and Mechanical College of Texas, 1928; M.S., 1935.

Edmondson, Andrew Joseph, Instructor in Mechanical Engineering. (1961)
B.S., Texas Technological College, 1957; M.S., Pennsylvania State, 1960.

Edmondson, Vance Ward, Associate Professor of Agricultural Economics. (1956, 1959)
B.S., Arkansas, 1948; M.S., Oklahoma Agricultural and Mechanical College, 1950; Ph.D., Cornell, 1956.

Eisele, John Allan, Associate Professor of Physics. (1962)
Ph.D., Ohio State, 1959.

Eisner, Melvin, Professor of Physics. (1948, 1957)
B.A., Brooklyn College, 1942; M.S., North Carolina, 1947; Ph.D., 1948.

Ekfelt, Fred Emil, Professor of English. (1938, 1951)
B. A., Iowa, 1931; M.A., 1932; Ph.D., 1941.

Elder, Frank Lawrence, Colonel, Professor of Military Science. (1958)
B.S., United States Military Academy, 1933.

Elkins, Rollin Lafayette, Associate Professor of Business Administration. (1935, 1946)
B.S., Agricultural and Mechanical College of Texas, 1933; M.S., 1935.

Ellett, Edwin Willard, Associate Professor of Veterinary Medicine and Surgery. (1958, 1961)
D.V.M., Georgia, 1953; B.S., Virginia Polytechnic Institute; 1954; M.S., Agricultural and Mechanical College of Texas, 1961.

Ellis, William C., Assistant Professor of Animal Husbandry. (1961)
B.S., Louisiana Polytechnic Institute, 1953; M.S., Missouri, 1955; Ph.D., 1958.

Elmquist, Karl Erik, Associate Professor of English. (1935, 1947)
A.B., Southern Methodist, 1932; M.A., Texas, 1939.

El-Sayed, Sayed Zakaria, Assistant Professor of Oceanography. (1961)
B.S., Alexandria, 1949; M.S., 1951; Ph.D., Washington, 1959.

Endrizzi, John Edwin, Assistant Professor of Agronomy. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., Maryland, 1955.

Ergle, David R., Senior Plant Physiologist of Plant Sciences Department (Agricultural Research Service, USDA, cooperating). (1944)
B.S., Clemson College, 1926; M.S., North Carolina, 1928; Ph.D., 1930.

Esten, Clarence Kenyon, Assistant Professor of English. (1946, 1951)
A.B., Baylor, 1931; M.A., 1949; M.A., 1961.

Eubank, Philip Toby, Assistant Professor of Chemical Engineering. (1961)
B.S., Rose Polytechnic Institute, 1958; Ph.D., Northwestern, 1961.

Evans, Benjamin Hampton, Associate Professor of Architecture. (1955, 1962)
B.Arch., Agricultural and Mechanical College of Texas, 1952; M.Arch., 1961.

Evans, Chester Eugene, Instructor in Modern Languages. (1960)
B.A., Texas, 1955.

Evers, Warren Dean, Assistant Professor of Veterinary Medicine and Surgery. (1962)
D.V.M., Michigan State, 1945.

Fanguy, Roy Charles, Assistant Professor of Poultry Science. (1958)
B.S., Mississippi State College, 1951; M.S., Alabama Polytechnic Institute, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Faulk, Odie B., Instructor in History. (1962)
B.S., Texas Technological College, 1958; M.A., 1960; Ph.D., 1962.

Fear, Frank Augustus, Assistant Professor of Veterinary Pathology. (1959, 1961)
D.V.M., Agricultural and Mechanical College of Texas, 1959.

Ferguson, Marvin Harry, Southwestern Director and National Research Coordinator of U. S. Golf Association, Green Section (Department of Soil and Crop Sciences cooperating). (1952, 1953)
B.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., Maryland, 1950.

Ferguson, Thomas Morgan, Associate Professor of Poultry Science. (1946, 1956)
B.A., Southwestern, 1936; M.S., Agricultural and Mechanical College of Texas, 1946; Ph.D., 1954.

Fisher, Flake Leroy, Associate Professor of Agronomy. (1949, 1959)
B.S., New Mexico College of Agriculture and Mechanic Arts, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1959.

Fitzgerald, Sherman Kirkham, Associate Professor of Sociology. (1962)
B.S., Brigham Young, 1948; M.S., 1949; Ph.D., Cornell, 1952.

Fleming, David Winston, Associate Professor of Mechanical Engineering. (1927, 1945)
B.S., Agricultural and Mechanical College of Texas, 1930; M.Ed., 1942.

Fletcher, Robert Holton, Associate Professor of Mechanical Engineering. 1947, 1958)
B.S., Pennsylvania State College, 1928; Reg. Prof. Engr.

Flournoy, Robert Wilson, Instructor in Biology. (1961)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1961.

Flowers, Archie Ingram, Associate Professor of Veterinary Microbiology. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1942; D.V.M., 1950; M.S., 1959.

Foldberg, Henry C., Athletic Director. (1962)
B.S., Florida, 1957.

Folweiler, A. D., Director of Texas Forest Service. (1949)
B.S., Pennsylvania State College, 1925; M.F., Yale, 1931; Ph.D., Wisconsin, 1943.

Ford, Peter Anthony, Instructor in History. (1960)
B.A., Providence College, 1956; M.A., Notre Dame, 1958; M.M.S., 1959.

Franceschini, Guy Arthur, Associate Professor of Meteorology. (1952, 1961)
B.S., Massachusetts, 1950; M.S., Chicago, 1952; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Franke, Harold William, Instructor in Animal Husbandry. (1961)
B.S., Agricultural and Mechanical College of Texas, 1947.

Franklin, Benjamin David, Instructor in Civil Engineering. (1958)
B.S., North Carolina State College, 1948; B.S., Agricultural and Mechanical College of Texas, 1958; M.S., 1962.

Freund, Rudolf J., Associate Director of the Institute of Statistics. (1962)
M.A., Chicago, 1951; Ph.D., North Carolina State College, 1955.

Fridel, George Edward, Instructor in Mathematics. (1957)
B.S., Houston, 1957.

Fuqua, Mark Charles, Assistant Professor of Horticulture. (1962)
B.S., Texas Technological College, 1951; M.S., Agricultural and Mechanical College of Texas, 1962.

Furr, Howard Lee, Professor of Civil Engineering. (1962)
B.S., Mississippi State College, 1941; M.S., Agricultural and Mechanical College of Texas, 1948; Ph.D., Texas, 1958.

Futrell, Maurice Chilton, Assistant Professor of Plant Sciences. (1958, 1962)
B.S., Western Kentucky State College, 1947; M.S., Wisconsin, 1949; Ph.D., 1952.

Gaddis, Alvis Mathew, Associate Professor of Mechanical Engineering. (1942, 1958)
A.B., Austin College, 1930.

**Gaines, J. C., Professor of Entomology and Head of Department. (1947, 1952)**
B.S., Alabama Polytechnic Institute, 1925; M.S., 1926; Ph.D., Iowa State College, 1937.

Gallaway, Bob Mitchel, Professor of Civil Engineering. (1944, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1946; M.Eng., 1956; Reg. Prof. Engr.

Galvin, Thomas Joseph, Assistant Professor of Veterinary Parasitology. (1959, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1957; B.S., 1961; M.S., 1961.

Gardner, Frederick Albert, Assistant Professor of Poultry Science. (1959)
B.S., Vermont, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., Missouri, 1960.

Garrison, Roger William, Lieutenant Colonel, Associate Professor of Air Science. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.B.A., Indiana, 1957.

German, John Paul, Professor of Electrical Engineering. (1958)
B.S., Texas, 1940; M.S., 1949; Ph.D., 1955; Reg. Prof. Engr.

Gibbs, Leon Wilford, Associate Professor of Veterinary Anatomy. (1949, 1958)
B.S., Agricultural and Mechanical College of Texas, 1939; D.V.M., 1949; M.S., 1957.

Gibbs, Robert H., Associate Professor of Mechanical Engineering. (1956)
B.S., United States Naval Academy, 1925; Reg. Prof. Engr.
(On leave of absence from 9-1-62 to 1-31-63.)

Gibson, Roy Howard, Instructor in Mechanical Engineering. (1933, 1947)

Gilruth, Robert Rowe, Visiting Professor of Aerospace Engineering. (1963)
B.S., Minnesota, 1935; M.S., 1936; D.Sc., Indiana Technical College, 1962; D.Sc., George Washington, 1962; D.Sc., Minnesota, 1962.

Gladden, James Kelly, Professor of Chemistry. (1959)
B.S., Howard College, 1942; M.S., Georgia Institute of Technology, 1944; Ph.D., Northwestern, 1952.

Glass, Sammie Edward, Assistant Professor of Veterinary Physiology and Pharmacology. (1962)
D.V.M., Agricultural and Mechanical College of Texas, 1960.

Glazener, Everett Ruthven, Associate Professor of Industrial Education. (1962)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946; D.Ed., Pennsylvania State, 1958.

Godfrey, Curtis L., Associate Professor of Agronomy. (1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1948; Ph.D., Iowa State College, 1951.

Goode, Phillip Baron, Professor of Business Administration. (1946, 1949)
B.S., Southern Methodist, 1933; LL.B., 1936; LL.M., Texas, 1953.

Gordon, William Thomas, Major, Associate Professor of Military Science. (1962)
B.S., Maryland, 1962.

Gottschalk, Martin Edward, Instructor in Modern Languages. (1960)
B.A., Texas Lutheran College, 1951; M.A., Texas, 1960.

Gould, Frank Walton, Associate Professor of Range and Forestry. (1949)
B.S., Northern Illinois State College, 1935; M.S., Wisconsin, 1937; Ph.D., California, 1941.

Gowing, Gene Martin, Assistant Professor of Veterinary Medicine and Surgery. (1959, 1961)
B.S., Agricultural and Mechanical College of Texas, 1957; D.V.M., 1959; M.S., 1961.
(On leave of absence from 9-1-62 to 8-31-63.)

Graff, William John, Dean of Instruction. (1961)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Purdue, 1951.

Gravett, Howard L., Professor of Biology. (1946, 1954)
A.B., James Millikin, 1933; M.A., Illinois, 1934; Ph.D., 1939.

Greeley, Ralph Gordon, Instructor in Veterinary Anatomy. (1960)
B.S., Missouri, 1953; D.V.M., 1953.

Green, Walter Luther, Instructor in Electrical Engineering. (1962)
B.S., Auburn, 1958; M.S., 1961.

Greer, Clayton Alvis, Associate Professor of English. (1938, 1949)
B.A., Texas, 1921; M.A., 1927; Ph.D., 1937.

Griffiths, John Frederick, Assistant Professor of Meteorology. (1962)
B.S., Kings College, 1947; M.S., Imperial College, 1949.

Groneman, Chris Harold, Professor of Industrial Education and Head of Department; Coordinator of Teacher Education. (1940, 1956)
B.S., Kansas State Teachers College, 1931; M.S., 1935; D.Ed., Pennsylvania State College, 1950.

Gruber, Kenneth Willis, Lieutenant Colonel, Associate Professor of Air Science. (1960)
B.S., United States Air Force Institute of Technology, 1950; M.B.A., George Washington, 1955.

Grumbles, Leland Creed, Professor of Veterinary Microbiology and Head of Department. (1949, 1957)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1957.

Guinn, John Pollard, Jr., Instructor in English. (1962)
B.A., Texas, 1938; M.A., 1947.

Guthrie, William Spurgeon, Associate Professor of Mechanical Engineering. (1942, 1950)
B.S., Central State Teachers College, 1930; M.A., Oklahoma, 1935; Reg. Prof. Engr.

Hale, Fred, Professor of Animal Husbandry in Charge of Swine Investigations. (1922, 1927)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1925.

Hall, Charles Franklin, Associate Professor of Veterinary Microbiology. (1959)
B.S., Kansas State College, 1949; D.V.M., 1951; M.S., Michigan State, 1959.

Hall, Claude Hampton, Associate Professor of History. (1951, 1959)
B.A., Virginia, 1947; M.A., 1949; Ph.D., 1954.

Hall, Dan, Associate Professor of Mathematics. (1928, 1944)
A.B., North Carolina, 1927; A.M., 1928.

Hall, Frederick Charles, Associate Professor of Aerospace Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., California Institute of Technology, 1957; Reg. Prof. Engr.

Hall, Wayne C., Dean of Graduate Studies and Professor of Plant Physiology and Pathology. (1949, 1960)
B.S., Iowa, 1941; M.S., 1946; Ph.D., 1948.

Halliwell, Robert Stanley, Assistant Professor of Plant Sciences. (1962)
B.S., Wyoming, 1956; M.S., Oregon, 1959; Ph.D., 1962.

Hallmark, Glen Duncan, Professor of Electrical Engineering and Head of Department. (1942, 1958)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1946; Ph.D., 1953.

Ham, Joe Strother, Associate Professor of Physics. (1956, 1958)
Ph.B., Chicago, 1948; M.S., 1951; Ph.D., 1954.

Hamilton, Thomas Rowan, Professor of Business Administration. (1929, 1937)
A.B., Washington and Lee, 1917; M.S., Columbia, 1924; Ph.D., 1938.

Hamman, Philip James, Assistant Professor of Entomology. (1962)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., 1958.

Hampton, Herbert Elwood, Professor of Agronomy. (1938, 1948)
B.S., Agricultural and Mechanical College of Texas, 1937; Ph.D., Missouri, 1943.

Hancock, Charles Kinney, Professor of Chemistry. (1946, 1949)
B.S., Southwest Texas State Teachers College, 1931; M.A., Texas, 1936; Ph.D., 1939.

Hanna, Ralph Lynn, Associate Professor of Entomology. (1949, 1956)
B.A., Stephen F. Austin State Teachers College, 1939; Ph.D., Agricultural and Mechanical College of Texas, 1951.

Hans, Harnum Singh, Assistant Professor of Physics. (1962)
B.A., Punjab, 1945; M.Sc., Banaras Hindu, 1948; Ph.D., Muslim, 1956.

Hardeman, Lyman Bryce, Associate Professor of Industrial Education. (1947, 1957)
B.S., Kansas State Teachers College, 1939; M.Ed., Agricultural and Mechanical College of Texas, 1949.

Harrington, Edwin Lincoln, Professor of Civil Engineering. (1939, 1957)
B.S., Wyoming, 1927; C.E., 1937; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1952; Reg. Prof. Engr.

Harrington, Marion Thomas, Chancellor. (1924, 1953)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1927; Ph.D., Iowa State College, 1941.

Harris, James Elliott, Instructor in Mathematics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1959.

Harris, Robert Leigh, Assistant Professor of History. (1951, 1955)
A.B., Alabama, 1945; M.A., 1946; Ph.D., Duke, 1956.

Harris, William Birch, Associate Professor of Chemical Engineering. (1956)
B.S., Colorado, 1941.

Harris, William Donald, Professor of Chemical Engineering. (1935, 1949)
B.S., Iowa State College, 1929; M.S., 1931; Ph.D., 1934; Reg. Prof. Engr.

Harrison, Arthur L., Plant Pathologist of Texas Agricultural Experiment Station, Yoakum. (1937, 1947)
B.S., Ontario Agricultural College, 1929; Ph.D., Cornell, 1935.

Harrison, William Arch, Instructor in Government. (1962)
B.S., Texas, 1958; B.A., 1958.

Hass, Nils Wulf, Instructor in Electrical Engineering. (1960)
B.S., Purdue, 1959.

Hauer, Louis Frederick, Associate Professor of English. (1937, 1961)
B.A., Dubuque, 1931; M.A., Iowa, 1933.

Haupt, Lewis McDowell, Jr., Professor of Electrical Engineering. (1930, 1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1935; Reg. Prof. Engr.

Hawkins, Leslie Virgle, Professor of Industrial Education. (1954, 1959)
B.S., Panhandle Agricultural and Mechanical College, 1938; M.S., Oklahoma Agricultural and Mechanical College, 1946; D.Ed., Pennsylvania State, 1953.

Hays, John Q., Professor of English. (1929, 1945)
A.B., Missouri, 1929; M.A., 1932; Ph.D., California, 1942.

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1956)
B.S., Stephen F. Austin State Teachers College, 1929; M.S., Agricultural and Mechanical College of Texas, 1936.

Heck, Walter W., Associate Professor of Plant Physiology and Pathology. (1959)
B.S., Ohio State, 1947; M.S., Tennessee, 1950; Ph.D., Illinois, 1954.

Hedges, Richard Marion, Assistant Professor of Chemistry. (1960)
B.S., Southern Methodist, 1950; Ph.D., Iowa State, 1955.

Henry, Walter Keith, Assistant Professor of Meteorology. (1957)
B.S., Missouri, 1941; M.S., Chicago, 1949.

Hensarling, Paul Reginald, Associate Professor of Education and Psychology and Acting Head of the Department. (1958, 1961)
B.S., North Texas State College, 1933; M.S., 1940; Ed.D., Houston, 1957.

Hensley, John Coleman, II, Instructor in Veterinary Medicine and Surgery. (1962)
D.V.M., Agricultural and Mechanical College of Texas, 1962.

Henson, James Bond, Associate Professor of Veterinary Pathology. (1962)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1959.

Henson, Robert Maurice, Instructor in Physics. (1961)
B.S., Agricultural and Mechanical College of Texas, 1960; M.S., 1962.

Hepburn, Charles McGuffey, Instructor in History and Government. (1960)
B.A., Stanford, 1950; M.A., 1957.

Hertzog, Frank Sherman, Major, Associate Professor of Military Science. (1962)
B.S., Colorado State, 1946; M.B.A., Denver, 1951.

Hewitt, Lester R., Jr., Captain, Assistant Professor of Air Science. (1962)
B.S., United States Naval Academy, 1952; M.A., Philippines, 1956.

Hierth, Harrison Ewing, Associate Professor of English. (1946, 1957)
A.B., Illinois Wesleyan, 1935; B.Ed., Illinois State Normal, 1936; M.A., Illinois, 1942; Ph.D., Wisconsin, 1956.

Hildreth, Roland James, Assistant Director, Texas Agricultural Experiment Station. (1954, 1959)
B.S., Iowa State College, 1949; M.S., 1950; Ph.D., 1954.

Hillman, John Rolfe, Assistant Professor of Mathematics. (1938, 1946)
B.S., Millsaps College, 1923; M.A., Missouri, 1929.

Hirsch, Teddy James, Associate Professor of Civil Engineering. (1956, 1962)
B.S., Agricultural and Mechanical College of Texas, 1952; M.Eng., 1953; Ph.D., 1961.

Hobgood, Price, Professor of Agricultural Engineering and Head of Department. (1939, 1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1940; Reg. Prof. Engr.

Holcomb, John W., Jr., Associate Professor of Agricultural Education. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Ed., 1953.

Holcomb, Robert Marion, Professor of Civil Engineering. (1947)
B.S., Arizona, 1936; M.S., Iowa State College, 1941; Ph.D., 1956; Reg. Prof. Engr.
(On leave of absence from 6-1-61 to 8-31-63.)

Holdredge, Edwin Sereno, Professor of Mechanical Engineering. (1939, 1957)
B.S., Tennessee, 1938; M.S., 1939; Reg. Prof. Engr.

Holland, Charles Donald, Professor of Chemical Engineering. (1952, 1959)
B.S., North Carolina State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1953.

Holleman, Theo Rufus, Professor of Architecture and Head of Division. (1946, 1958)
B.Arch., Agricultural and Mechanical College of Texas, 1940; M.Arch., 1951; Reg. Prof. Arch.

Holt, Ethan Cleddy, Professor of Agronomy. (1948, 1957)
B.S., Alabama Polytechnic Institute, 1943; M.S., Purdue, 1948; Ph.D., 1950.

Holt, Oris Milton, Associate Professor of Agricultural Education. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946; Ed.D., Houston, 1962.

Hood, Donald Wilbur, Professor of Oceanography. (1946, 1960)
B.S., Pennsylvania State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1950.

Hope, Lannes Homer, Assistant Professor of Psychology. (1961)
B.S., Texas Technological College, 1949; M.Ed., 1950; Ph.D., Texas, 1960.

Hopkins, Sewell Hepburn, Professor of Biology. (1935, 1947)
B.S., William and Mary College, 1927; M.A., Illinois, 1930; Ph.D., 1933.

Horsley, Wendell Graham, Assistant Professor of Architecture. (1959, 1961)
B.F.A., Denver, 1950.

Horton, Guy Mann, Instructor in Journalism. (1961)
B.S., East Texas State, 1953; M.Ed., 1957.

Hotchkiss, Thomas Atkins, Lieutenant Colonel, Associate Professor of Military Science. (1961)
B.A., Virginia Military Institute, 1937.

House, William Clyde, Jr., Assistant Professor of Business Administration. (1962)
B.B.A., Texas, 1954; M.B.A., 1958.

Houze, Robert Alvin, Library Director. (1949, 1957)
A.B., Denver, 1940; B.L.S., 1941.

Hovorak, Louis Martin, Instructor in Mathematics. (1946)
B.S., Agricultural and Mechanical College of Texas, 1943; M.Ed., 1952.

Hoyle, Samuel Cooke, Jr., Professor of Business Administration. (1947, 1957)
LL.B., Texas, 1926; B.A., 1946; M.A., 1948.

Hubert, Frank William R., Dean of Arts and Sciences. (1959)
B.A., Texas, 1938; M.A., 1945; Ph.D., 1950.

Hudgins, Ellis A., Instructor in History. (1961)
B.A., Baylor, 1954; B.D., Southwestern Baptist Theological Seminary, 1957; M.A., Baylor, 1961.

Huebner, George Lee, Jr., Senior Research Scientist, Department of Oceanography and Meteorology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1946; M.S., 1951; Ph.D., 1953.

Huggett, Milton Alfred, Assistant Professor of English. (1946, 1951)
B.A., Rochester, 1929; B.D., Episcopal Theological School, 1933; M.A., Baylor, 1952.

Huggins, Frank Norris, Assistant Professor of Mathematics. (1954, 1962)
B.A., Howard Payne College, 1948; M.S., North Texas State College, 1950.

Hunter, Parks Caldwell, Jr., Associate Professor of English. (1955, 1962)
B.A., Miami, 1948; B.Ed., 1949; M.A., 1950; Ph.D., Texas, 1958.

Hupp, Eugene W., Associate Professor of Biology. (1962)
B.S., Nebraska, 1954; M.S., 1957; Ph.D., Michigan State, 1959.

Hurt, John Tom, Professor of Mathematics. (1936, 1947)
B.A., Rice Institute, 1931; M.A., 1932; Ph.D., 1935.

Huss, Donald Lee, Assistant Professor of Range and Forestry. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1954; Ph.D., 1959.

Hutchison, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1949; M.Ed., 1950.

Inglis, Jack Morton, Instructor in Wildlife Management. (1958)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1952.

Isbell, Arthur Furman, Professor of Chemistry. (1953, 1961)
B.A., Baylor, 1937; M.S., Texas, 1941; Ph.D., 1943.

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health and Head of Department. (1937, 1957)
B.S., Agricultural and Mechanical College of Texas, 1924; D.V.M., 1926.

James, Kate Longstreth, Instructor in English. (1960)
B.A., Los Angeles State College, 1956; M.A., 1960.

Jaska, Robert Clement, Associate Professor of Agricultural Education. (1948, 1962)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Jernigan, Jesse Stewart, Assistant Professor of English. (1952, 1954)
B.A., North Texas State College, 1933; M.A., Southern Methodist, 1946; M.A., California, 1950.

Jessee, William Taze, Captain, Assistant Professor of Military Science. (1960)
B.S., United States Military Academy, 1954.

Jimenez, Rudolph August, Associate Professor of Civil Engineering. (1959, 1962)
B.S., Arizona, 1948; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Joham, Howard Ernest, Professor of Plant Physiology and Pathology. (1946, 1959)
B.A., Santa Barbara College, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., Iowa State College, 1950.

Jones, Claude Kelly, Assistant Professor of Veterinary Medicine and Surgery. (1961)
B.S., Agricultural and Mechanical College of Texas, 1943; D.V.M., 1943.

Jones, Jerrel Boyd, Assistant Professor of Electrical Engineering. (1960, 1962)
B.S., Southern Methodist, 1958; M.S., 1960.

Jones, Jerry Lynn, Assistant Professor of Chemistry. (1962)
B.A., Oklahoma State, 1957; M.S., 1960; Ph.D., Arkansas, 1962.

Jones, Truman Ross, Jr., Professor of Civil Engineering. (1947, 1960)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1955.

Jungerman, Paul Frank, Associate Professor of Veterinary Microbiology. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1947; M.S., 1959.

Justin, James Robert, Instructor in Agronomy. (1960)
B.S., Pennsylvania State, 1955; M.S., 1957.

Kadow, William Bruce, Assistant Professor of English. (1954, 1959)
A.B., Arkansas, 1951; M.A., 1952.

Kahan, Archie Marion, Director of the Texas Engineering Experiment Station. (1953, 1962)
B.A., Denver, 1936; M.A., 1940; M.S., California Institute of Technology, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Kane, Richard Andrew, Assistant Professor of Physics. (1961)
S.B., Massachusetts Institute of Technology, 1956; A.M., Harvard, 1956.

Kapadia, Zarir Jamasji, Instructor in Biology. (1962)
B.S., Bombay, 1955; Ph.D., 1959; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Kavanaugh, Milam Shelby, Associate Professor of Psychology. (1947, 1951)
B.A., Texas, 1934; M.A., 1934.

Keel, Loyd Bush, Assistant Professor of English. (1942, 1947)
B.A., Texas, 1927; M.A., 1933.

Keese, Charles Joseph, Executive Officer of the Texas Transportation Institute and Professor of Civil Engineering. (1948, 1962)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Kemler, Arden Grant, Associate Professor of Veterinary Anatomy. (1959)
D.V.M., Kansas State College, 1950; M.S., Georgia, 1959.

Kennedy, Harvey Thomas, Distinguished Professor of Petroleum Engineering. (1949)
B.S., Cornell, 1921; Ph.D., Johns Hopkins, 1928; Reg. Prof. Engr.

Kent, Jack Thurston, Associate Professor of Mathematics. (1936, 1952)
A.B., Lambuth College, 1930; M.A., Arkansas, 1931.

Keown, Ernest Ray, Professor of Mathematics. (1952, 1960)
B.S., Texas, 1946; Ph.D., Massachusetts Institute of Technology, 1950.

Kerley, Sidney Auston, Director of Counseling and Testing Center and Associate Professor of Education. (1952, 1960)
B.A., Agricultural and Mechanical College of Texas, 1939; M.Ed., North Texas State College, 1950.

Kidd, Harry Lee, Jr., Associate Professor of English. (1939, 1950)
B.A., Texas, 1935; M.A., 1938.

Kilmer, Robert E., Assistant Professor of Industrial Engineering. (1961)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1958.

Kincannon, John Alvin, Associate Professor of Agricultural Economics. (1946, 1960)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1949; Ph.D., 1952.

King, Donald Roy, Associate Professor of Entomology. (1953, 1958)
B.S., Baldwin-Wallace College, 1949; M.S., Ohio State, 1951; Ph.D., 1952.

King, General Tye, Associate Professor of Animal Husbandry. (1953, 1960)
B.S., Kentucky, 1950; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Kinman, Murray Luther, Agronomist of the Department of Soil and Crop Sciences. (1950)
B.S., Kansas State College, 1942; M.S., Iowa State College, 1944; Ph.D., 1950.

Klipple, Edmund Chester, Professor of Mathematics and Head of Department. (1935, 1952)
B.A., Texas, 1926; Ph.D., 1932.

Knapp, Robert Andrew, Instructor in Mathematics. (1957)
B.S., United States Naval Academy, 1922; M.Ed., Agricultural and Mechanical College of Texas, 1954.

Knebel, Earl H., Professor of Agricultural Education and Head of Department. (1955, 1961)
B.S., Montana State College, 1946; M.Ed., Agricultural and Mechanical College of Texas, 1951; D.Ed., Oklahoma Agricultural and Mechanical College, 1955.

Koenig, Karl Joseph, Associate Professor of Geology. (1955, 1957)
B.S., Illinois, 1941; M.S., 1946; Ph.D., 1949.

Kohel, Russel James, Geneticist. (1959)
B.S., Iowa State College, 1956; M.S., Purdue, 1958; Ph.D., 1959.

Konecny, Frank Jack, Executive Assistant, Engineering Extension Service. (1955)
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Kornicker, Louis Sampson, Associate Professor of Oceanography. (1961)
B.S., Alabama, 1941; B.S., 1942; M.A., Columbia, 1954; Ph.D., 1957.

Kraemer, Duane Carl, Instructor in Animal Husbandry. (1960)
B.S., Wisconsin, 1955; M.S., Agricultural and Mechanical College of Texas, 1960.

Kranz, Edward Douglas, Instructor in Mechanical Engineering. (1952)

Krise, George Martin, Associate Professor of Biology. (1959)
B.A., Texas, 1946; M.A., 1948; Ph.D., 1952.

Kroitor, Harry Peter, Assistant Professor of English. (1958)
B.A., Saskatchewan, 1946; B.A., 1949; M.A., 1950; Ph.D., Maryland, 1957.

Krueger, Willie F., Professor of Poultry Science. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1949; Ph.D., Missouri, 1952.

Kunkel, Harriott Orren,* Professor of Animal Husbandry and of Biochemistry and Nutrition. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1948; Ph.D., Cornell, 1950.

Kunze, George William, Professor of Agronomy. (1952, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1950; Ph.D., Pennsylvania State College, 1952.

Kunze, Otto Robert, Associate Professor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Iowa State College, 1951.
(On leave of absence from 9-1-62 to 8-31-63.)

Kutach, Wilbur Dee, Assistant Professor of Sociology and Professional Counselor, Counseling and Testing Center. (1952, 1962)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1952.

Kyre, Martin Theodore, Jr., Assistant Professor of History and Government. (1959, 1962)
B.A., Ohio Wesleyan, 1950; M.A., Washington, 1957; Ph.D., 1962.

LaMotte, Charles, Professor of Biology. (1930, 1939)
B.A., Texas, 1929; M.A., 1929; Ph.D., Illinois, 1937.

Landiss, Carl Wilson, Professor of Health and Physical Education. (1943, 1954)
B.S., Abilene Christian College, 1935; M.Ed., Agricultural and Mechanical College of Texas, 1947; D.Ed., Pennsylvania State College, 1951.

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*Became Associate Director of Agricultural Experiment Station effective 12-1-62.

Lanford, Samuel Taylor, Assistant Professor of Architecture. (1962)
B.Arch., Agricultural and Mechanical College of Texas, 1950.

Lang, Herbert Howard, Associate Professor of History. (1956, 1959)
B.A., Texas, 1949; M.A., 1950; Ph.D., 1954.

Langston, Ruble George, Professor of Plant Sciences. (1961)
B.S., Oklahoma, 1947; M.S., 1951; Ph.D., Purdue, 1954.

Larsen, John E., Horticulturist. (1962)
B.S., Purdue, 1942; M.S., 1946; Ph.D., 1957.

Laverty, Carroll Dee, Professor of English. (1939, 1955)
A.B., Colorado, 1933; A.M., 1934; Ph.D., Duke, 1951.

Laywell, Clifton Myron, Instructor in Animal Husbandry. (1960, 1961)
B.S., Southwest Texas State Teachers College, 1956.

Lee, Dean Ralph, Associate Professor of Chemistry. (1941, 1962)
B.S., Memphis State College, 1937; M.S., Agricultural and Mechanical College of Texas, 1939.

Lee, Morris B., Assistant Professor of Aerospace Engineering. (1962)
B.S., Oklahoma, 1948; B.S., 1951.

Leighton, Rudolph Elmo, Professor of Dairy Science. (1947, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1932; M.S., 1943; Ph.D., Agricultural and Mechanical College of Texas, 1956.
(On leave of absence from 9-1-61 to 8-31-63.)

Leinweber, Charles Lee, Professor of Range and Forestry and Head of Department. (1960)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1953; Ph.D., 1956.

Leipper, Dale F., Professor of Oceanography and Meteorology and Head of Department. (1949, 1950)
B.S., Wittenberg College, 1937; M.A., Ohio State, 1939; Ph.D., California, 1950.

Lemons, Clifton Dale, Instructor in Engineering Graphics. (1962)
B.S., North Texas State, 1956; M.Ed., 1959.

Letbetter, Thomas Doyle, Associate Professor of Business Administration. (1948)
B.B.A., Texas, 1933; M.S., Agricultural and Mechanical College of Texas, 1947; C.P.A., 1949.

Lewis, Robert Donald,* Director of Texas Agricultural Experiment Station. (1946)
B.S., Pennsylvania State College, 1919; Ph.D., Cornell, 1926.

Lindquist, Donald A., Entomologist. (1961)
B.S., Oregon State, 1952; M.S., Iowa State, 1956; Ph.D., 1958.

Lindsay, James Donald, Professor of Chemical Engineering and Head of Department. (1938, 1944)
B.S., Michigan, 1924; M.S., 1925; Ph.D., 1934; Reg. Prof. Engr.

Lindsey, James L., Director of College Information and Publications. (1962)
B.A., Texas Technological College, 1938.

Linger, Irving Oscar, Associate Professor of Economics. (1961)
A.B., Ohio, 1939; M.A., Ohio State, 1942; Ph.D., Texas, 1958.

Little, Van Allen, Professor of Entomology. (1923, 1937)
B.A., Sam Houston State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1925; Ph.D., 1943.

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*Retired effective 11-30-62.

Logan, Brian Warren, Research Scientist in Oceanography. (1959)
B.S., West Australia, 1954; Ph.D., 1956.

Logan, Earl, Jr., Assistant Professor of Mechanical Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1958; Ph.D., Purdue, 1961; Reg. Prof. Engr.

Lorms, John Louis, Captain, Assistant Professor of Military Science. (1962)
B.A., Agricultural and Mechanical College of Texas, 1957.

Lowe, Dan Copeland, Assistant Professor of Business Administration. (1955, 1961)
B.S., Stephen F. Austin State College, 1946; M.Ed., 1951.

Loyd, Coleman Monroe, Coordinator of the National Science Foundation Programs and Assistant Professor of Physics. (1953, 1961)
B.S., Nebraska State Teachers College, 1939; M.A., Wayne, 1948; M.S., Agricultural and Mechanical College of Texas, 1955.

Luke, Hugh Jay, Jr., Assistant Professor of English. (1960, 1962)
B.A., Texas, 1956; M.A., 1957.

Luther, Herbert Adesla, Professor of Mathematics. (1937, 1947)
B.A., Pittsburgh, 1934; M.S., Iowa, 1935; Ph.D., 1937.

Lyerly, Paul J., Research Coordinator, Substation No. 17, Texas Agricultural Experiment Station, Ysleta. (1942, 1958)
B.S., North Carolina State College, 1938; M.S., Iowa State College, 1940; Ph.D., 1942.

Lyle, Robert Reed, Assistant Professor of Mathematics. (1937, 1946)
B.S., Washington and Jefferson College, 1931; M.A., Buffalo, 1933.

Lyles, Henry Francis, Instructor in Business Administration. (1958)
B.B.A., North Texas State College, 1956; M.B.A., 1957.

Lyman, Carl Morris, Professor of Biochemistry and Nutrition and Head of Department. (1940, 1949)
B.S., Oregon, 1931; A.M., Oregon State College, 1933; Ph.D., Pittsburgh, 1937.

Lynch, Shirley Alfred, Professor of Geology and Head of Department of Geology and Geophysics. (1946)
B.S., Missouri, 1928; M.S., 1931; E.M., 1935; Reg. Prof. Engr.

Lyons, Charles Rogers, Director of Student Health. (1956, 1957)
A.B., Miami, 1938; M.D., Ohio State, 1941.

McAfee, Thomas Edison, Professor of Agronomy. (1939, 1957)
B.S., Oklahoma Agricultural and Mechanical College, 1939; M.S., 1940; Ph.D., Agricultural and Mechanical College of Texas, 1953.

McCandless, Charles Emery, Assistant Professor of Physical Education. (1961)
B.S., Agricultural and Mechanical College of Texas, 1956; M.Ed., 1958.

McCasland, William Richard, Associate Professor of Civil Engineering. (1956, 1962)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957.

McCrady, James David, Assistant Professor of Veterinary Physiology and Pharmacology. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1952; D.V.M., 1958.
(On leave of absence from 6-1-62 to 5-31-63.)

McCulley, William Straight, Associate Professor of Mathematics. (1937, 1957)
B.A., Iowa State, 1932; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1956.

McCully, Wayne Gunther, Associate Professor of Range and Forestry. (1948, 1960)
B.S., Colorado State College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1958.

McCune, William Edward, Professor of Agricultural Engineering. (1959)
B.S., Kansas State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1944.

McGee, Roger Valentine, Associate Professor of Mathematics. (1928, 1948)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1938.

McGinty, Ralph Jerry, Instructor in Agricultural Engineering. (1961)
B.S., Kansas State, 1959; M.S., 1960.

McGuire, Delbert, Professor of Journalism and Head of Department. (1961)
B.J., Texas, 1947; M.Jour., 1948.

McGuire, John Gilbert, Professor of Architecture and Assistant Dean of Engineering. (1935, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1937; B.S., 1944; Reg. Prof. Engr.

McLain, Donald Davis, Jr., Assistant Professor of Biology. (1962)
B.S., Illinois, 1952; M.S., 1956; Ph.D., 1960.

McLellan, Hugh John, Professor of Oceanography. (1957, 1961)
B.S., Dalhousie University, Halifax, Nova Scotia, 1941; M.S., 1947; Ph.D., Scripps Institute of Oceanography, 1956.

McMahan, Elizabeth Esther, Instructor in English. (1962)
B.A., Houston, 1958; M.A., 1962.

McMurry, Edgar Dowling, Assistant to the Dean of Veterinary Medicine. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1951.

McNeely, John Gordon, Professor of Agricultural Economics. (1947, 1950)
B.S., South Dakota State College, 1933; M.S., 1934; Ph.D., Wisconsin, 1941.

McNiel, Norbert Arthur, Assistant Professor of Genetics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1935; M.Ed., 1952; Ph.D., 1955.

MacKellar, Alan Douglas, Instructor in Physics. (1961)
B.S.E., Michigan, 1958; M.S., 1960.

Mackin, John Gilman, Professor of Biology and Head of Department. (1950, 1960)
B.S., East Central State College, Ada, Oklahoma, 1924; M.S., Illinois, 1927; Ph.D., 1933.

Macpherson, Joseph Tant, Instructor in History. (1962)
B.S., Peabody College, 1950; M.A., Vanderbilt, 1958.

Magee, Aden Combs, Professor of Agricultural Economics. (1955, 1956)
B.S., Kansas State College, 1924; M.S., Agricultural and Mechanical College of Texas, 1926.

Mamaliga, Emil, Associate Professor of Health and Physical Education. (1947, 1957)
B.S., Ohio State, 1943; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Manning, Walter Scott, Associate Professor of Business Administration. (1941, 1947)
B.B.A., Texas College of Arts and Industries, 1932; M.B.A., Texas, 1940: C.P.A., 1952.

Manring, Jimmy Darrell, Assistant Professor of Floriculture. (1962)
B.S., Washington State, 1958; M.S., Colorado State, 1960.

Marsh, James Hyde, III, Assistant Professor of Architecture. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1957.

Martin, John Floyd, Captain, Assistant Professor of Air Science. (1962)
B.S., United States Naval Academy, 1951.

Martin, Lee Jackson, Associate Professor of English. (1946, 1957)
B.S., Texas, 1941; M.A., 1948; Ph.D., Stanford, 1956.

Mason, Paul M., Associate Professor of Engineering Graphics. (1946, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1946.

Matchin, Tom Owen, Major, Associate Professor of Military Science. (1962)
A.A., New Mexico Military Institute, 1943.

Mattern, Terrence John, Assistant Professor of English. (1953, 1957)
B.A., George Peabody College, 1947; M.A., 1947.

Maxwell, Norman Paul, Associate Horticulturist. (1946, 1955)
B.S., Delaware, 1943; M.S., Agricultural and Mechanical College of Texas, 1949.

Medlen, Ammon Brown, Associate Professor of Biology. (1946, 1955)
B.A., Baylor, 1930; M.A., 1932; Ph.D., Agricultural and Mechanical College of Texas, 1952.

Meeks, Robert Dosher, Instructor in Electrical Engineering. (1962)
B.S., Texas Technological College, 1959.

Meinke, Wilmon William, Associate Professor of Chemical Engineering. (1936, 1961)
B.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1949.

Merrill, John Calhoun, Jr., Associate Professor of Journalism. (1962)
B.A., Mississippi Delta State College, 1949; M.A., Louisiana State, 1950; Ph.D., Iowa, 1962.

Mestanza, Walter Froilan, Assistant Professor of Veterinary Pathology. (1960)
D.V.M., Universidad Nacional de San Marcos (Lima), 1951; M.S., Virginia Polytechnic Institute, 1959.

Meyers, Edward Arthur, Associate Professor of Chemistry. (1956, 1961)
B.S., Michigan, 1950; Ph.D., Minnesota, 1955.

Miller, Charles Standish, Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956; Ph.D., 1959.

Miller, Jarvis Ernest, Associate Professor of Agricultural Economics. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Purdue, 1951; Ph.D., 1954.
(On leave of absence from 2-5-61 to 3-31-63.)

Miller, Thomas Lloyd, Associate Professor of History. (1946, 1957)
B.A., East Texas State Teachers College, 1935; M.A., 1945; Ph.D., Texas, 1956.

Milliff, John Henry, Professor of Veterinary Anatomy and Head of Department. (1936, 1941)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; D.V.M., 1936; Ph.D., Texas, 1958.

Mills, Jim Frank, Assistant Professor of Agronomy. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Moehlman, Carl B., Instructor in Mathematics. (1942)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1932.

Monroe, Haskell Moorman, Jr., Assistant Professor of History and Government. (1959, 1962)
B.A., Austin College, 1952; M.A., 1954; Ph.D., Rice, 1961.

Moore, Albert Vernon, Professor of Dairy Science. (1937, 1944)
B.S., Purdue, 1927; M.S., 1933; Ph.D., Michigan State College, 1948.

Moore, Bill C., Associate Professor of Mathematics. (1937, 1948)
A.B., Kansas, 1929; A.M., 1931; A.M., Princeton, 1937.

Moore, Clarence Albert, Associate Professor of Agricultural Economics. (1954, 1958)
B.S., West Texas State College, 1945; M.S., Illinois, 1946.

Moore, Donald Sylvester, Associate Professor of Agricultural Economics and Sociology. (1956, 1962)
B.S., Oklahoma Agricultural and Mechanical College, 1938; M.S., 1940; Ph.D., Minnesota, 1956.

Moore, Richard Wayne, Associate Professor of Veterinary Microbiology. (1958, 1961)
D.V.M., Agricultural and Mechanical College of Texas, 1955; M.S., 1956.

Morgan, Stewart Samuel, Professor of English. (1921, 1935)
B.A., Cincinnati, 1926; M.A., Ohio State, 1927; Ph.D., 1933.

Morrison, John Elliott, Assistant Professor of Veterinary Medicine and Surgery. (1962)
D.V.M., Auburn, 1950.

Morton, Gloria Isaac, Instructor in English. (1962)
B.S., Idaho, 1954.

Morton, Howard LeRoy, Research Agronomist. (1957, 1962)
B.S., Idaho, 1950; M.S., 1952; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Moyer, Vance Edwards, Professor of Meteorology. (1958, 1961)
B.S., Pennsylvania State, 1950; M.S., 1951; Ph.D., 1954.

Mullins, Benjamin Franklin Kelso, Professsor of Engineering Graphics. (1921, 1954)
A.B., Emory, 1919; M.S., 1922; M.R.E., Southwestern Baptist Theological Seminary, 1927; M.S., Agricultural and Mechanical College of Texas, 1944; Reg. Prof. Engr.

Murad, John Lewis, Instructor in Biology. (1962)
B.A., Austin College, 1956; M.A., North Texas State, 1958.

Nance, Joseph Milton, Professor of History and Head of Department of History and Government. (1941, 1958)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1941.

Nash, James Mosely, Assistant Professor of Mechanical Engineering and of Industrial Engineering. (1957, 1962)
B.S. (Math), Houston, 1957; B.S. (M.E.), 1957; M.S., Agricultural and Mechanical College of Texas, 1962.

Naugle, Norman Wakefield, Assistant Professor of Mathematics. (1958, 1962)
B.A., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Nelson, Al B., Professor of History. (1937, 1956)
B.A., Texas Christian, 1932; M.A., 1933; Ph.D., California, 1937.

Nelson, Bardin Hubert, Professor of Sociology. (1950, 1956)
B.S., Louisiana State, 1942; M.A., 1943; Ph.D., 1950.

Niles, George Alva, Assistant Professor of Agronomy. (1953, 1959)
B.S., New Mexico State, 1949; M.S., Oklahoma State, 1950; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Nowak, Mathew A., Assistant Professor of Architecture. (1954, 1962)
B.S., Southwest Texas State Teachers College, 1953.

Nowlin, Worth Dabney, Instructor in Oceanography. (1962)
B.A., Agricultural and Mechanical College of Texas, 1958; M.S., 1960.

Noyes, Theodore Alvan, Assistant Professor of Mechanical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1957; Reg. Prof. Engr.

O'Bannon, Lester Severance, Professor of Mechanical Engineering. (1948)
B.M.E., Kentucky, 1915; M.E., 1939; Reg. Prof. Engr.

Old, William Donald, II, Captain, Assistant Professor of Military Science. (1960)
B.S., United States Military Academy, 1954.

Oliver, John Eoff, Assistant Professor of Business Administration. (1959)
B.B.A., Texas, 1929; M.S., Agricultural and Mechanical College of Texas, 1937.

Oliver, John Percy, Professor of Engineering Graphics. (1936, 1956)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1936; Reg. Prof. Engr.

Olson, Edward O., Pathologist of Department of Soil and Crop Sciences, USDA, Substation No. 15. (1949)
B.S., South Dakota State, 1940; M.S., Colorado State, 1944; Ph.D., Louisiana State, 1948.

Olson, Robert Merle, Assistant Professor of Civil Engineering. (1959, 1961)
B.S., Texas, 1947; M.S., Rice Institute, 1959.

Orr, Joseph Anderson, Professor of Civil Engineering. (1928, 1944)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1933; Reg. Prof. Engr.

Packenham, Edward S., Associate Professor of Business Administration. (1947, 1955)
B.S., Lombard College, 1928; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1949.

Page, John Orion, Associate Professor of Chemistry. (1948, 1951)
B.S., Rochester, 1927; Ph.D., Illinois, 1933.

Palmer, Leslie Lloyd, Associate Professor of Health and Physical Education. (1951, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1951.

Parker, Grady P., Professor of Education. (1940, 1950)
B.A., North Texas State Teachers College, 1929; M.A., Southern Methodist, 1935; Ed.D., Texas, 1942.

Parker, Travis Jay, Professor of Geology. (1947, 1952)
B.S., Texas Technological College, 1933; M.A., Texas, 1939; Ph.D., 1952; Reg. Prof. Engr.

Parks, Paul Franklin, Assistant Professor of Biochemistry and Nutrition. (1962)
B.S., Auburn, 1956; M.S., 1959; Ph.D., Agricultural and Mechanical College of Texas, 1962.

Parry, Douglas Farlow, Professor of Education and Psychology. (1956)
B.A., Utah, 1937; M.A., 1938; Ph.D., Syracuse, 1942.

Paterson, Donald R., Associate Horticulturist, Department of Soil and Crop Sciences. (1952, 1956)
B.S., Cornell, 1947; M.S., California, 1950; Ph.D., Michigan State, 1952.

Patterson, Raleigh Elwood, Dean of Agriculture.* (1958, 1962)
B.S., Louisiana State, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., 1943.

Pawlisch, Paul E., Assistant Professor of Agronomy. (1959)
B.S., Wisconsin, 1955; M.S., 1957; Ph.D., 1959.

Pedigo, John Randolph, Associate Professor of Petroleum Engineering (1953)
B.S., Texas, 1935; B.A., 1935.

Peirce, James Franklin, Assistant Professor of English. (1946, 1951)
A.B., Illinois, 1940; M.A., Iowa, 1942.

Penberthy, Walter Lawren, Professor of Health and Physical Education. (1926, 1959)
B.S., Ohio State, 1926.

Perry, Bruce A., Horticulturist, Department of Soil and Crop Sciences. (1946, 1951)
B.S., Wake Forest College, 1930; M.A., 1936; Ph.D., Virginia, 1942.

Perry, Haile Deucalion, Assistant Professor of Mathematics. (1955, 1959)
B.S., Sam Houston State Teachers College, 1939; M.A., 1949.

Perry, John Vivian, Jr., Assistant Professor of Mechanical Engineering. (1949, 1955)
B.S., Virginia Polytechnic Institute, 1947; M.S., Agricultural and Mechanical College of Texas, 1954; Reg. Prof. Engr.

Peters, Isaac Isaac, Associate Professor of Dairy Science. (1950, 1952)
B.S.A., Manitoba, 1942; M.S., Michigan State College, 1944; Ph.D., Iowa State College, 1947.

Pierce, Kenneth Ray, Assistant Professor of Veterinary Pathology. (1961)
D.V.M., Agricultural and Mechanical College of Texas, 1957; M.S., 1962.

Piermattei, Donald Loss, Assistant Professor of Veterinary Medicine and Surgery. (1962)
B.S., Michigan State, 1953; M.S., 1960; D.V.M., 1954.

Pinnell, Charles, Assistant Professor of Civil Engineering. (1958)
B.S., Texas Technological College, 1952; M.S., Purdue, 1958.
(On leave of absence from 9-1-62 to 5-31-63.)

Piper, Charles Woods, Captain, Assistant Professor of Air Science. (1961)
B.A., George Washington, 1949; M.A., Stanford, 1957.

Poe, Richard DeMoye, Instructor in Chemistry. (1962)
B.S., East Texas State College, 1956; M.S., 1957.

Ponthieux, Nicholas Archibald, Associate Professor of Health and Physical Education. (1941, 1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1950.

Porter, Kenneth Boyd, Agronomist of Department of Soil and Crop Sciences. (1947, 1957)
B.S., Kansas State College, 1940; M.S., Iowa State College, 1947; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Porter, Russell Alan, Jr., Assistant Professor of Business Administration. (1962)
B.B.A., North Texas State College, 1958; M.B.A., 1960.

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*Became Dean of Agriculture and Director of Agricultural Experiment Station effective 12-1-62.

Potter, James Gregor, Professor of Physics and Head of Department. (1945)
B.S., Princeton, 1928; M.S., New York, 1931; Ph.D., Yale, 1939.

Potts, Richard Carmechial, Assistant Director of Agricultural Instruction and Professor of Agronomy. (1936, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1935; M.S., Agricultural and Mechanical College of Texas, 1945; Ph.D., Nebraska, 1950.

Poulsen, Niel Bowman, Instructor in Nuclear Engineering. (1962)
B.S., Alberta, 1960.

Powell, Francis Warren, Assistant Professor of English. (1937, 1944)
B.A., Austin College, 1920; M.A., Texas, 1928.

Prescott, John Mack, Professor of Biochemistry and Nutrition. (1952, 1959)
B.S., Southwest Texas State Teachers College, 1941; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., Wisconsin, 1952.

Price, Alvin Audis, Dean of Veterinary Medicine and Assistant Director of the Texas Agricultural Experiment Station. (1949, 1962)
B.S., Agricultural and Mechanical College of Texas, 1940; D.V.M., 1949; M.S., 1956.

Price, Manning A., Associate Professor of Entomology. (1940, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1941.

Provost, Richard Leon, Instructor in Education and Psychology and of Counseling and Testing Center. (1956, 1960)
B.A., Drake, 1951; M.S., 1956.

Putnam, Harlan Ray, Associate Professor of Economics. (1941, 1946)
B.S., Iowa State College, 1935; M.A., 1941.

Quinby, John Roy, Agronomist of Texas Agricultural Experiment Station, Chillicothe. (1924, 1925)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Quinn, Major Charles, Instructor in Modern Languages. (1960)
B.S., Stanford, 1948; M.A., 1952.

Quisenberry, John Henry, Professor of Poultry Science and Head of Department. (1936, 1946)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., Illinois, 1933; Ph.D., 1936.

Rakoff, Henry, Associate Professor of Chemistry. (1953, 1957)
B.S., City College of New York, 1944; M.S., Purdue, 1948; Ph.D., 1950.

Ramge, John Christian, Associate Professor of Veterinary Medicine and Surgery. (1959)
D.V.M., Ohio State, 1942; M.S., 1950; Ph.D., 1955.

Randall, John Del, Assistant Professor of Nuclear Engineering. (1958)
B.S., California, 1955; M.S., 1956.
(On leave of absence from 6-1-62 to 5-31-63.)

Randerson, Darryl, Instructor in Oceanography and Meteorology. (1962)
B.S., Agricultural and Mechanical College of Texas, 1960; M.S., 1962.

Randolph, Neal Malcolm, Associate Professor of Entomology. (1957)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1938.

Ransdell, Clifford Howell, Assistant to the Dean of Engineering and Professor of Engineering Graphics. (1937, 1960)
B.S., Texas Technological College, 1937; B.S., Agricultural and Mechanical College of Texas, 1953; Sc.D., Howard Payne College, 1956; M.Ed., Texas, 1957; Reg. Prof. Engr.

Ray, Sammy Mehedy, Assistant Professor of Oceanography. (1959)
B.S., Louisiana State, 1942; M.A., Rice Institute, 1952; Ph.D., 1954.

Redmond, Harold Edwin, Professor of Veterinary Medicine and Surgery. (1940, 1952)
D.V.M., Agricultural and Mechanical College of Texas, 1939.

Reeves, Robert Gatlin, Professor of Genetics. (1928, 1947)
B.S., Mississippi State College, 1922; M.S., 1923; Ph.D., Iowa State College, 1928.

Reid, Robert Osborne, Professor of Oceanography and Meteorology. (1951, 1959)
B.E., Southern California, 1946; M.S., Scripps Institute of Oceanography, 1948.

Reiser, Raymond, Professor of Biochemistry and Nutrition. (1949, 1954)
A.B., Western Reserve, 1929; Ph.D., Ohio State, 1936.

Rekoff, Michael George, Jr. Associate Professor of Electrical Engineering. (1954, 1961)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955; Ph.D., Wisconsin, 1961; Reg. Prof. Engr.

Reyna, Eddie, Instructor in Physics. (1961)
B.S., Sam Houston State Teachers College, 1950; M.S., Agricultural and Mechanical College of Texas, 1959.

Rhodes, Robert Raymond, Associate Professor of Range and Forestry. (1946, 1954)
B.S.F., Louisiana, 1937; M.S., Agricultural and Mechanical College of Texas, 1951.

Richardson, Luther Ray, Professor of Biochemistry and Nutrition. (1946, 1949)
B.S., Georgetown College, 1923; A.M., Missouri, 1928; Ph.D., 1932.

Richmond, Thomas Rollin, Agronomist of Department of Soil and Crop Sciences (Agricultural Research Service, USDA, cooperating). (1931, 1954)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1938; Ph.D., Minnesota, 1948.

Riggs, John Kamm, Professor of Animal Husbandry. (1941, 1955)
B.S., Iowa State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1941.

Ritter, Harry Otto, Assistant Professor of Journalism. (1962)
B.A., Kansas, 1959; M.A., 1960.

Rivers, George W., Agronomist, Department of Soil and Crop Sciences (Agricultural Research Service, USDA, cooperating). (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., 1957.

Robertson, Walter Volley, Instructor in Biology. (1960)
B.S., Stephen F. Austin State College, 1951; M.S., Agricultural and Mechanical College of Texas, 1959.

Robinson, Leroy P., Lecturer in Industrial Engineering. (1962)
Reg. Prof. Engr.

Robinson, Richard Michael, Instructor in Veterinary Pathology. (1962)
B.S., Arizona State, 1952.

Roche, John Edward, Associate Professor of Business Administration. (1957)
B.S., Baylor, 1946; M.A., Texas, 1950; Ph.D., 1956.

Rodenberger, Charles Alvard, Associate Professor of Aerospace Engineering. (1960)
B.S., Oklahoma State, 1948; M.S., Southern Methodist, 1959; Reg. Prof. Engr.

Rodewald, Fred Arthur, Instructor in English. (1959)
B.A., Agricultural and Mechanical College of Texas, 1958; M.A., North Texas State College, 1959.

Roeber, Charles Arthur, Business Manager. (1929, 1954)
B.B.A., Texas, 1929; B.A., 1929.

Rogers, Jerry William, Instructor in Electrical Engineering. (1962)
B.S., Texas Technological College, 1959.

Romane, William Murry, Associate Professor of Veterinary Medicine and Surgery. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1943.

Roots, Edmund Nelson, Jr., Assistant Professor of Electrical Engineering. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956.

Rosberg, David William, Professor of Plant Physiology and Pathology and Head of Department of Plant Sciences. (1950, 1960)
B.A., St. Olaf College, 1940; M.S., Ohio State, 1946; Ph.D., 1949.

Rose, Norman Carl, Associate Professor of Chemistry. (1956, 1961)
B.S., California, 1950; Ph.D., Kansas, 1957.

Ross, Henry, Professor of Agricultural Education. (1935)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1935.

Rotsch, Melvin Medford, Professor of Architecture. (1950, 1955)
B.S., Texas, 1928; M.Arch., Harvard, 1930.

Rowan, Neilon Joyce, Assistant Professor of Civil Engineering and Assistant Research Engineer, Texas Transportation Institute. (1959)
B.S., Texas Technological College, 1957; M.S., Agricultural and Mechanical College of Texas, 1959.

Rudder, James Earl, President of the College. (1958, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; LL.D., Baylor, 1960.

Rupel, Isaac Walker, Professor of Dairy Science and Head of Department. (1945)
B.S., Illinois, 1923; M.S., Wisconsin, 1924; Ph.D., 1932.

Russell, Daniel, Professor of Sociology. (1926)
A.B., Baylor, 1922; A.M., Chicago, 1928.

Russell, Leon Horace, Jr., Assistant Professor of Veterinary Public Health. (1959)
B.S., Missouri, 1956; D.V.M., 1956; M.P.H., Tulane, 1958.

Russell, William Low, Professor of Geology. (1946, 1951)
B.A., Yale, 1920; M.S., 1922; Ph.D., 1927.

Ryan, Cecil Benjamin, Associate Professor of Poultry Science. (1947, 1962)
B.S., Texas College of Arts and Industries, 1938; M.S., Agricultural and Mechanical College of Texas, 1947; Ph.D., 1962.

Samson, Charles Harold, Jr., Professor of Aerospace Engineering, Civil Engineering, and of Structural Mechanics. (1960)
B.S., Notre Dame, 1947; M.S., 1948; Ph.D., Missouri, 1953; Reg. Prof. Engr.

Sanders, Horace M., Jr., Captain, Assistant Professor of Military Science. (1961)
B.S., Agricultural and Mechanical College of Texas, 1945.

Sandstedt, John Leonard, Assistant Professor of Business Administration. (1954, 1960)
B.A., Texas, 1942; LL.B., 1947.

Sanford, Tommy Eugene, Assistant Professor of Meteorology. (1960, 1961)
B.S., Texas, 1954.

Schatte, Curtis Eric, Instructor in English. (1960)
B.A., Sam Houston State Teachers College, 1949; M.A., 1952.

Schertz, Keith Francis, Geneticist. (1959)
B.S., Illinois, 1949; M.S., 1950; Ph.D., Cornell, 1957.

Schiller, Robert Edwin, Jr., Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1949; Reg. Prof. Engr.

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences; Professor of Geography and Head of Department. (1934, 1959)
B.A., Iowa State Teachers College, 1927; M.A., Clark, 1928; Ph.D., Nebraska, 1935.

Schrader, Allen, Assistant Professor of English. (1957, 1961)
B.A., Los Angeles State College, 1956; M.A., 1957.

Schroeder, Harry William, Plant Pathologist of Department of Plant Sciences, AMS, USDA. (1957)
B.S., Minnesota, 1951; M.S., 1955; Ph.D., 1955.

Schroeder, Melvin Carroll, Associate Professor of Geology. (1954, 1956)
B.S., State College of Washington, 1942; M.S., 1947; Ph.D., 1953.

Scott, Mary Gwendolyn Gordon, Instructor in English. (1962)
B.A., Texas, 1940; M.A., 1950.

Segner, Edmund Peter, Jr., Associate Professor of Civil Engineering. (1954, 1962)
B.S., Texas, 1949; M.S., 1952; Ph.D., Agricultural and Mechanical College of Texas, 1962; Reg. Prof. Engr.

Segrest, Herman Brazill*, Professor of Health and Physical Education. (1945, 1958)
B.S., North Texas State Teachers College, 1937; M.S., 1946; M.Ed., Agricultural and Mechanical College of Texas, 1955.

Seward, Clay Luzenberg, Jr., Associate Professor of Geology. (1948, 1952)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1950; Geol.E., 1953.

Shafer, Carl Ewing, Assistant Professor of Agricultural Economics. (1962)
B.S., Oklahoma State, 1955; M.S., 1958; Ph.D., Pennsylvania State, 1962.

Shelton, James Maurice, Associate Animal Husbandman of Texas Agricultural Experiment Station, Department of Animal Husbandry. (1950, 1960)
B.S., Tennessee, 1946; M.S., Agricultural and Mechanical College of Texas, 1952; Ph.D., 1957.

Shepperd, James Nolen, Assistant Professor of English. (1941, 1947)
B.A., Texas, 1931; M.A., 1936.

Shubinski, Robert Parker, Instructor in Civil Engineering. (1958)
B.A., Rice Institute, 1957; B.S., 1958.
(On leave of absence from 9-1-62 to 5-31-63.)

Sicilio, Fred, Associate Professor of Chemistry. (1961)
B.S., Centenary College, 1951; M.A., Vanderbilt, 1953; Ph.D., 1956.

Simmang, Clifford Max, Professor of Mechanical Engineering and Head of Department. (1938, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1938; Ph.D., Texas, 1952; Reg. Prof. Engr.

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*Resigned effective October 15, 1962.

Simons, Donald Frederick, Assistant Professor of Business Administration. (1961)
B.B.A., Houston, 1954; M.B.A., Texas, 1955.

Sims, Stillman Austin, Associate Professor of Mathematics. (1942, 1959)
B.S., Southwest Texas State Teachers College, 1939; M.S., Agricultural and Mechanical College of Texas, 1944.

Sittler, Orvid Dayle, Assistant Professor of Physics. (1961)
B.S., Nebraska, 1948; M.A., 1950; Ph.D., Pennsylvania State, 1961.

Skrabanek, Robert Leonard, Professor of Sociology. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947; Ph.D., Louisiana State, 1949.

Skrivanek, John Marion, Associate Professor of Modern Languages. (1952, 1959)
B.A., Texas, 1938; M.A., 1946; Ph.D., Charles (Prague), 1948.

Smerdon, Ernest Thomas, Professor of Agricultural Engineering. (1959, 1962)
B.S., Missouri, 1951; M.S., 1956; Ph.D., 1959.

Smith, Benjamin Frederick, Major, Associate Professor of Air Science. (1960)
A.B., Wittenberg College, 1953; M.B.A., Ohio State, 1956.

Smith, Fred Emmett, Professor of Geology and of Geography. (1948, 1956)
B.S., Louisiana State, 1930; M.S., 1932.

Smith, Frank Miller, Associate Professor of Civil Engineering. (1948, 1957)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1939; Reg. Prof. Engr.

Smith, James Clifton, Superintendent of Substation No. 3, Angleton. (1951)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947.

Smith, James Douglas, Assistant Professor of Agronomy. (1959)
B.S., Iowa State College, 1950; M.S., 1956; Ph.D., 1960.

Smith, Ronald Edward, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Smith, Robert Lee, Jr., Associate Professor of Industrial Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952.

Snuggs, Roland Edward, Associate Professor of Chemistry. (1924, 1946)
A.B., Georgetown College, 1920; M.S., Florida, 1923; B.S., Agricultural and Mechanical College of Texas, 1937.

Snyder, Roy Webster, Extension Meat Specialist, Texas Agricultural Experiment Station. (1930)
B.S., Iowa State College, 1921; M.S., 1922.

Sorensen, Anton Marinus, Jr., Associate Professor of Animal Husbandry. (1955, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., Cornell, 1951; Ph.D., 1953.

Sorensen, Harold Benjamin, Associate Professor of Agricultural Economics and Sociology. (1951, 1956)
B.S., South Dakota State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Sorenson, Jerome Wallace, Professor of Agricultural Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1948.

Sorrels, Joseph Harrell, Professor of Civil Engineering. (1941, 1948)
A.B., Texas Christian, 1924; M.S., Vanderbilt, 1925; B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

Sperry, John Jerome, Professor of Biology. (1941, 1951)
B.A., Nebraska, 1936; M.A., Missouri, 1938; Ph.D., Nebraska, 1942.

Sperry, Omer Edison, Professor of Range and Forestry. (1946, 1949)
A.B., Peru, Nebraska State College, 1925; M.A., Nebraska, 1931; Ph.D., 1934.

Spurlock, William W., Instructor in Chemistry. (1958)
B.A., Daniel Baker College, 1924; M.S., Agricultural and Mechanical College of Texas, 1961.

Squire, Charles F., Associate Dean of the School of Arts and Sciences and Professor of Physics. (1962)
Ph.D., Johns Hopkins, 1937.

Stacell, Alan Louis, Assistant Professor of Architecture. (1960, 1961)
B.F.A., Illinois, 1955; M.F.A., 1960.

Stallings, Henry Green, Instructor in Mechanical Engineering. (1946)

Stark, Lawrence Edward, Professor of Engineering Graphics. (1941, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1951.

Starkey, James F., Colonel, Professor of Air Science. (1962)
A.B., Denver, 1948.

Staten, Raymond Dale, Associate Professor of Agronomy. (1956, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1947; M.S., Nebraska, 1949; Ph.D., 1951.

Steele, Edgar Lowell, Associate Professor of Chemistry. (1962)
B.S., Clemson College, 1952; M.S., 1954; Ph.D., Virginia, 1957.

Stelly, Randall, Associate Professor of Agricultural Economics and Sociology. (1956, 1960)
B.S., Southwestern Louisiana Institute, 1940; M.S., Agricultural and Mechanical College of Texas, 1947; Ph.D., Louisiana State, 1956.

Stephens, Alva Ray, Instructor in History. (1962)
B.A., Oklahoma, 1954; M.A., 1957; Ph.D., Texas, 1962.

Stern, Louis Harold, Assistant Professor of Economics. (1955, 1957)
B.S., Illinois, 1947; M.A., California, 1954.

Stevenson, Leland Lewis, Major, Associate Professor of Military Science. (1960)
B.S., Agricultural and Mechanical College of Texas, 1948.

Stevenson, Robert M., Professor of Business Administration and Acting Head of Division. (1947, 1961)
B.A., Duke, 1937; M.A., Pennsylvania State College, 1946; C.P.A., 1948; D.B.A., Indiana, 1955; C.L.U., 1955.

Steward, Weldon Cecil, Assistant Professor of Architecture. (1962)
B.Arch., Agricultural and Mechanical College of Texas, 1957; M.Arch, Columbia, 1961.

Stewart, Billy Ray, Assistant Professor of Agricultural Engineering. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1959.

Stewart, Norman Arthur, Jr., Associate Professor of Business Administration. (1946, 1957)
LL.B., Baylor, 1938.

Stokes, Elmore Ewing, Jr., Associate Professor of English. (1951, 1958)
B.A., Texas, 1943; M.A., 1948; Ph.D., 1951.

Storey, James Benton, Associate Professor of Horticulture. (1957, 1961)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1953; Ph.D., California, 1957.

Stout, Neil Ralph, Instructor in History. (1961)
A.B., Harvard, 1954; M.S., Wisconsin, 1958; Ph.D., 1961.

Street, Robert Lewis, Instructor in Industrial Engineering. (1962)
B.S., Agricultural and Mechanical College of Texas, 1950.

Street, William Ezra, Professor of Engineering Graphics and Head of Department. (1941)
B.S., Texas Technological College, 1930; M.A., 1933; LL.D., Harding College, 1947; Reg. Prof. Engr.

Strode, Willard, Professor of Architecture. (1962)
B.Arch., Agricultural and Mechanical College of Texas, 1951; M.S., Iowa State, 1959.

Stuverud, Homer Alton, Lieutenant Colonel, Associate Professor of Military Science. (1960)
B.A., State Teachers College, Mayville, North Dakota, 1937; M.A., North Carolina, 1954.

Sullivan, Pat, Assistant Professor of Education and Psychology. (1962)
B.A., Texas Technological College, 1947; M.Ed., Fresno State College, 1951.

Suttle, Andrew D., Jr., Vice President for Research and Professor of Chemistry. (1962)
B.S., Mississippi State, 1944; Ph.D., Chicago, 1952.
(On leave of absence from 10-1-62 to 9-30-63.)

Sweet, Harry Jerome, Assistant Professor of Civil Engineering. (1957, 1962)
B.S., Agricultural and Mechanical College of Texas, 1956.

Szabuniewicz, Michael, Assistant Professor of Veterinary Physiology and Pharmacology. (1962)
D.V.M., Veterinary College, Lemberg, 1934; D.V., 1937.

Tadlock, William Carthan, Assistant Professor of Business Administration. (1961)
B.S., Mississippi State College, 1957; M.B.A., Mississippi State, 1958.

Taylor, Dee Orville Noble, Associate Professor of Veterinary Pathology. (1961)
B.S., Colorado Agricultural and Mechanical College, 1952; D.V.M., 1954; M.S., Purdue, 1960; Ph.D., 1961.

Taylor, Lloyd Chamberlain, Jr., Associate Professor of History. (1956, 1962)
B.A., Lehigh, 1949; M.A., 1951; Ph.D., 1956.

Teer, James Garth, Assistant Professor of Wildlife Management. (1962)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1951.

Tefertiller, Kenneth Ray, Assistant Professor of Agricultural Economics. (1959)
B.S., Oklahoma State, 1952; M.S., 1957; Ph.D., Illinois, 1959.

Thames, Walter Hendrix, Jr., Associate Professor of Plant Physiology and Pathology. (1959)
B.S.A., Florida, 1947; M.S., 1948; Ph.D., 1959.

Theoharis, Athan George, Instructor in History. (1962)
A.B., Chicago, 1956; A.B., 1957; A.M., 1959.

Thompson, Aylmer Henry, Associate Professor of Oceanography and Meteorology. (1960)
A.B., California at Los Angeles, 1947; M.A., 1948; Ph.D., 1960.

Thompson, Herley Curry, Instructor in Soil and Crop Sciences. (1962)
B.S., Illinois, 1960; M.S., 1961.

Thompson, Herbert Gordon, Jr., Associate Professor of Business Administration. (1951, 1954)
B.S., Miami, 1947; M.B.A., 1949.

Thompson, John George Hatch, Professor of Mechanical Engineering. (1938, 1954)
B.S., Pennsylvania State College, 1933; M.E., 1938; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1962; Reg. Prof. Engr.

Thompson, Robert Dale, Assistant Professor of Business Administration. (1960)
B.A., DePauw, 1925; M.A., Trinity, 1960.

Thornton, William Lee, Assistant Professor of Business Administration. (1958, 1962)
B.A., Indiana, 1957; M.B.A., 1958.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology and Head of Department. (1947, 1953)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1936; M.P.A., Harvard, 1947; D.P.A., 1949.

Tishler, Card Edward, Professor of Health and Physical Education and Head of Department. (1941, 1947)
B.S., Ohio State, 1926; M.A., Western Reserve, 1935.

Tittle, Morris Edward, Associate Professor of Mathematics. (1943, 1959)
B.A., East Texas State Teachers College, 1923; M.A., Texas, 1937.

Titus, Robert Stephen, Assistant Professor of Veterinary Medicine and Surgery. (1960, 1962)
B.S., Oklahoma State, 1958; D.V.M., 1959.

Traxler, Ralph N., Professor of Chemistry and of Civil Engineering. (1959)
A.B., Colorado, 1920; M.A., 1922; Ph.D., Wisconsin, 1926.

Treacy, John Joseph, Assistant Professor of Economics. (1961)
B.S., South Carolina, 1957.

Trogdon, William Oren, Professor of Agronomy and Head of the Department of Soil and Crop Sciences. (1958)
B.S., Oklahoma State, 1942; Ph.D., Ohio State, 1949.

Truettner, Willard Irving, Professor of Mechanical Engineering. (1930, 1943)
B.S., Michigan, 1928; M.S.E., 1930; Reg. Prof. Engr.

Turk, Richard Duncan, Professor of Veterinary Parasitology and Head of Department. (1944)
D.V.M., Kansas State College, 1933; M.S., Agricultural and Mechanical College of Texas, 1939.

van Buijtenen, Johannes Petrus, Silviculturist. (1960, 1962)
B.S., Landbowhogeschool (Netherlands), 1952; M.S., California, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Vanderzant, Carl, Professor of Dairy Science. (1953, 1962)
B.S., Wageningen, 1947; M.S., 1949; M.S., Iowa State College, 1950; Ph.D., 1953.

Vanderzant, Erma Schumacher, Biochemist of Department of Biochemistry and Nutrition. (1954)
B.S., Iowa State, 1943; Ph.D., 1953.

VanIngen, John Visger, Assistant Professor of Business Administration. (1962)
A.B., Hobart College, 1946; M.B.A., Michigan, 1952.

Varvel, Walter A., Professor of Psychology. (1941, 1945)
A.B., Kansas, 1932; M.A., 1933; Ph.D., 1938.

Vaught, Steve Murphy, Instructor in Architecture. (1962)
B.B.A., Agricultural and Mechanical College of Texas, 1952; B.Arch., 1962.

Vernon, Albert Edward, Lieutenant Colonel, Associate Professor of Military Science. (1961)
B.S., South Carolina, 1938.

Vidaud, Guillermo, Assistant Professor of Architecture. (1962)
Diploma of "Arquitecto", Havana, 1953.

Vilas, John Rudolf, Captain, Assistant Professor of Military Science. (1962)
B.S., Agricultural and Mechanical College of Texas, 1953.

Vrooman, Richard, Professor of Architecture. (1949, 1960)
B.A., Oberlin College, 1941; B.Arch., Western Reserve, 1949; M.Arch., Agricultural and Mechanical College of Texas, 1952; Reg. Prof. Arch.
(On leave of absence from 9-1-61 to 8-31-63.)

Wagner, William Grant, Assistant Professor of Architecture. (1954, 1956)
B.Arch., Texas, 1949; Reg. Prof. Arch.

Wainerdi, Richard Elliott, Associate Dean of Engineering. (1957, 1962)
B.S., Oklahoma, 1952; M.S., Pennsylvania State, 1955; Ph.D., 1958; Reg. Prof. Engr.

Walden, James Cecil, Assistant Professor of Architecture. (1955, 1960)
B.Arch., Agricultural and Mechanical College of Texas, 1955.
(On leave of absence from 6-1-62 to 5-31-64.)

Waldrip, William Jasper, Assistant Range Scientist. (1950, 1961)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950; Ph.D., 1962.

Walton, Henry Harrison, Assistant Professor of Health and Physical Education. (1958, 1962)
B.S., Northwestern State College, 1957; M.S., 1958.

Wamble, Albert Cecil, Research Engineer of Texas Engineering Experiment Station. (1945)
B.S., Agricultural and Mechanical College of Texas, 1933.

Watkins, Gustav McKee, Director of Agricultural Instruction and Professor of Plant Physiology and Pathology. (1949, 1960)
B.A., Texas, 1929; M.S., 1930; Ph.D., Columbia, 1935.

Watson, Charles Richard, Assistant Professor of Architecture. (1961)
B.Arch., Agricultural and Mechanical College of Texas, 1956.

Weaver, James Nevin, Associate Professor of Entomology. (1951, 1957)
B.A., Southwestern, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1953.

Webb, Earl Sherman, Associate Professor of Agricultural Education. (1961)
B.S., Missouri, 1949; M.Ed., 1955; D.Ed., 1959.

Weekes, Donald Fessenden, Professor of Physics. (1937, 1945)
B.S., Middlebury College, 1924; M.A., Amherst College, 1926; Ph.D., Cornell, 1937.

Weihing, Ralph Martin, Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Colorado Agricultural and Mechanical College, 1930; M.S., Nebraska, 1932; Ph.D., 1934.

Weiner, Peter Douglas, Assistant Professor of Mechanical Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., 1961; Reg. Prof. Engr.

Weitzel, Hulbert Frederick, Jr., Captain, Assistant Professor of Air Science. (1958)
B.B.A., Houston, 1949.

Wells, Charles Brinton, Jr., Lieutenant Colonel, Associate Professor of Air Science. (1959)
A.B.J., Georgia, 1941.

Wells, Ernest Stewart, Instructor in Modern Languages. (1961)
B.A., Brigham Young, 1958.

Whealy, Roger Dale, Professor of Chemistry. (1958)
B.S., Eastern Normal, South Dakota, 1930; M.S., Colorado, 1937; M.S., Oregon, 1948; Ph.D., Colorado, 1953.

White, Robert Frederick, Professor of Architecture. (1947, 1954)
B.S., Pennsylvania State College, 1934; M.Land., Michigan, 1951.

Whitehouse, Ulysses Grant, Director, Electron Microscope Laboratory and Associate Professor of Biochemistry and Nutrition. (1953, 1961)
B.S., Kentucky, 1940; M.S., 1941; M.S., Iowa, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Whiteley, Eli Lamar, Associate Professor of Agronomy. (1946, 1959)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., North Carolina State, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Whiting, Robert Louis, Professor of Petroleum Engineering and Head of Department. (1946, 1954)
B.S., Texas, 1939; M.S., 1943; Reg. Prof. Engr.

Whitmore, Frank Charles, Coordinator of the National Aeronautics and Space Administration Programs. (1951, 1962)
A.B., Gettysburg College, 1949; M.A., Delaware, 1951.

Whitney, Howard Stephen*, Associate Professor of Agricultural Economics. (1954, 1962)
B.S., Oklahoma Agricultural and Mechanical College, 1943; M.S., 1948; Ph.D., 1962.

Wieder, Russell Karl, Assistant Professor of Health and Physical Education. (1956, 1960)
B.A., Kenyon College, 1942.

Wiening, Victor, Assistant Professor of English. (1952, 1956)
B.A., Valparaiso, 1947; M.A., Louisiana State, 1949.

Wiff, Donald Ray, Instructor in Physics. (1960)
B.S., Capital, 1958; M.A., Kent State, 1960.

Wilkes, Lambert Henry, Associate Professor of Agricultural Engineering. (1957)
B.S., Clemson Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Williams, John Donald, Assistant Research Statistician, Data Processing Center, and Assistant Professor of Statistics. (1958, 1961)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957; Ph.D., 1961.

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*Resigned effective 11-12-62.

Williams, Mack Lester, Instructor in Mathematics. (1955)
B.S., North Texas State College, 1942; M.S., 1949.

Williamson, Donald N., Captain, Assistant Professor of Air Science. (1962)
B.S., United States Military Academy, 1952.

Wingren, Roy Matthew, Professor of Mechanical Engineering. (1928, 1943)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1934; Reg. Prof. Engr.

Wolf, Kenneth, Major, Associate Professor of Air Science. (1959)
B.B.A., Baylor, 1955; M.B.A., Agricultural and Mechanical College of Texas, 1961.

Wood, Norris Philip, Associate Professor of Microbiology. (1955, 1960)
B.S., Hartwick College, 1949; M.S., Cornell, 1951; Ph.D., Pennsylvania, 1955.

Woodcock, David Geoffrey, Instructor in Architecture. (1962)
B.Arch., Manchester, 1960.

Woolket, Joseph John, Professor of Modern Languages and Head of Department. (1925, 1945)
A.B., Oberlin College, 1924; M.A., 1925.

Wooten, Alvin Boyd, Associate Professor of Agricultural Economics. (1960)
B.A., Agricultural and Mechanical College of Texas, 1937; M.S., 1950; Ph.D., 1955.

Worley, Willard Parker, Instructor in Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; Reg. Prof. Engr.

Wright, Samuel Robert, Professor of Civil Engineering and Head of Department. (1923, 1946)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1928; C.E., 1931; Ph.D., 1946; Reg. Prof. Engr.

Wykes, Stanley Allen, Professor of Industrial Engineering. (1947, 1951)
B.S., Pennsylvania State College, 1940; M.S., Virginia Polytechnic Institute, 1946; Reg. Prof. Engr.

Wythe, Landon Douglas, Jr., Assistant Professor of Animal Husbandry. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955.

Young, Bernard Theodore, Instructor in Physics. (1962)
B.S., State Teachers College (Slippery Rock, Pennsylvania), 1952; M.S., Agricultural and Mechanical College of Texas, 1961.

Young, Mark Francis, Assistant Professor of Veterinary Medicine and Surgery. (1960, 1962)
B.S., Utah State, 1955; D.V.M., Iowa State, 1958.

Young, Paul A., Plant Pathologist of Texas Agricultural Experiment Station, Jacksonville. (1935)
B.S., Wabash College, 1921; M.A., Illinois, 1923; Ph.D., 1925.

Zingaro, Ralph Anthony, Associate Professor of Chemistry. (1954, 1959)
B.S., City College of New York, 1946; M.S., Kansas, 1949; Ph.D., 1950.

Zinn, Bennie A., Director of the Department of Student Affairs. (1945, 1961)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1928.

Zwolinski, Bruno John, Professor of Chemistry. (1961)
B.S., Canisius, 1941; M.S., Purdue, 1943; M.A., Princeton, 1944; Ph.D., 1947.

## RETIRED FACULTY MEMBERS

Adriance, Guy Webb, Professor Emeritus of Horticulture. (1921, 1960)
B.S., Agricultural and Mechanical College of Texas, 1915; M.S., California, 1917; Ph.D., Michigan State College, 1929.

Bagley, John Brewer, Professor Emeritus of Cotton Marketing. (1905, 1947)
B.A., Wake Forest College, 1900.

Bass, James Horace, Professor Emeritus of History. (1940, 1961)
B.A., North Texas State Teachers College, 1924; M.A., Texas, 1931; Ph.D., 1933.

Berry, Raymond Orvil, Professor Emeritus of Animal Husbandry. (1931, 1960)
B.S., North Texas State Teachers College, 1928; M.S., Agricultural and Mechanical College of Texas, 1932; Ph.D., Johns Hopkins, 1939.

Bonnen, Clarence Alfred, Professor of Agricultural Economics. (1937, 1948)
B.S., Illinois, 1920; M.S., 1924.

Bossler, Robert Burns, Professor of Petroleum Engineering. (1956)
B.S., Pittsburgh, 1918.

Boughton, Ivan Bertrand, Professor of Veterinary Pathology. (1948, 1953)
D.V.M., Ohio State, 1916.

Brewer, Alexander Van, Professor Emeritus of Mechanical Engineering, (1922, 1957)
B.S., Purdue, 1913; M.E., 1925; M.S., Agricultural and Mechanical College of Texas, 1937; Reg. Prof. Engr.

Cofer, David Brooks, Professor of English and Archivist Emeritus. (1910, 1957)
A.B., Centre College, 1907; M.A., Wisconsin, 1927.

Darnell, Albert Laurie, Professor Emeritus of Dairy Science. (1914, 1957)
B.S., Mississippi State College, 1914; M.A., Missouri, 1916.

Doak, Clifton Childress, Professor Emeritus of Biology. (1926, 1960)
B.S., North Texas State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1928; Ph.D., Illinois, 1933.

Downard, Richard Walter, Assistant Professor Emeritus of Mechanical Engineering. (1913, 1961)

Dunn, Ralph Clark, Professor Emeritus of Veterinary Bacteriology and Hygiene. (1911, 1950)
D.V.M., Ohio, 1911.

Fudge, Joseph Franklin, Professor of Agronomy. (1929, 1949)
B.S., Illinois, 1924; M.S., Wisconsin, 1925; Ph.D., 1928.

Gammon, Samuel Rhea, Professor Emeritus of History. (1925, 1957)
A.B., Washington and Lee, 1911; M.A., 1913; Ph.D., Johns Hopkins, 1921.

Gibbons, Eldred Harris, Associate Professor of Microbiology. (1925, 1939)
B.S.A., Tennessee, 1925; S.M., Chicago, 1929.

Godbey, Chauncey Barger, Professor Emeritus of Genetics and Statistics. (1926, 1961)
B.S., Kentucky, 1925; M.S., Agricultural and Mechanical College of Texas, 1926.

Gunter, Percy Glyndon, Professor Emeritus of English. (1911, 1955)
A.B., Elon College, 1909; M.A., North Carolina, 1910.

Hardaway, Bernice Aubrey, Associate Professor of Engineering Graphics. (1946, 1957)
B.S., East Texas State Teachers College, 1933; M.Ed., Agricultural and Mechanical College of Texas, 1948.
(Deceased 11-23-62.)

Harter, Edward Lin, Associate Professor Emeritus of Chemistry. (1921, 1959)
A.B., Missouri Wesleyan, 1919; M.A., Kansas, 1927.

Hedgcock, Ernest Duval, Professor of English. (1936, 1949)
B.A., Tennessee, 1917; M.A., Texas, 1936.

Hughes, Martin Collins, Professor Emeritus of Electrical Engineering. (1923, 1962)
B.S., Illinois, 1917; E.E., 1926; Reg. Prof. Engr.

Hunt, Robert Lee, Professor Emeritus of Agricultural Economics. (1927, 1961)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., North Carolina State College, 1927; Ph.D., Wisconsin, 1934.

Jones, Beecher Calvin, Assistant Professor Emeritus of Chemistry. (1921, 1947)
A.B., Baylor, 1921; B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1926.

Jones, Fred Rufus, Professor of Agricultural Engineering. (1921, 1940)
B.S., Wisconsin, 1915; M.S., Iowa State College, 1931; Reg. Prof. Engr.

Kenagy, Herbert Glenn, Associate Professor of Business Administration. (1955, 1957)
Ph.B., Central Missouri Teachers College, 1912; A.B., Missouri, 1916; B.S., 1916; M.A., Minnesota, 1917.

Key, Percy Clark, Associate Professor Emeritus of English. (1924, 1957)
B.A., Texas Christian, 1917; M.A., Vanderbilt, 1918.

Kyle, Edwin Jackson, Dean Emeritus of the School of Agriculture. (1902, 1945)
B.S., Agricultural and Mechanical College of Texas, 1899; B.S.A., Cornell, 1901; M.S.A., 1902; D.Sc., Arkansas, 1941.

Langford, Ernest, Professor Emeritus of Architecture. (1915, 1957)
B.S., Agricultural and Mechanical College of Texas, 1913; M.S., Illinois, 1924; Reg. Prof. Arch.

Leland, Thomas William, Professor Emeritus of Business Administration. (1922, 1961)
B.A., Wisconsin, 1921; M.S., 1922; C.P.A., 1928.

Lewis, Robert Donald, Director of the Texas Agricultural Experiment Station. (1946)
B.S., Pennsylvania State College, 1919; Ph.D., Cornell, 1926.

Middleton, Errol Bathurst, Professor Emeritus of Chemistry. (1922, 1962)
B.A., Illinois, 1919; M.S., 1921; Ph.D., 1938.

Miller, Horace Otis, Associate Professor of Journalism. (1947, 1948)
A.B., Texas, 1918; M.J., 1920; LL.B., 1928.

Mogford, Joseph Sayers, Professor of Agronomy. (1925, 1937)
B.S., Agricultural and Mechanical College of Texas, 1916; M.S., 1920.

Nelson, Thomas Robert, Associate Professor Emeritus of Mathematics. (1925, 1957)
B.A., East Texas Normal College, 1917; M.A., Texas, 1922.

Overall, John Wayne, Instructor in Physics. (1943, 1951)
A.B., Baylor, 1921; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Porter, Walter Lee, Professor Emeritus of Mathematics. (1918, 1959)
A.B., Howard College, 1911; M.S., Agricultural and Mechanical College of Texas, 1926.

Potts, William McDaniel, Professor Emeritus of Chemistry. (1926, 1958)
B.S., Chicago, 1921; M.S., 1927; Ph.D., 1937.

Reinhard, Henry J., Professor Emeritus of Entomology. (1947, 1960)
B.S., Ohio State, 1915.

Richey, John Jefferson, Professor Emeritus of Civil Engineering. (1912, 1959)
B.S., Illinois, 1903; C.E., 1910.

Rode, Norman Frederick, Professor Emeritus of Electrical Engineering. (1922, 1962)
B.S., Clemson College, 1919; M.S., Agricultural and Mechanical College of Texas, 1929; E.E., Clemson College, 1939; Reg. Prof. Engr.

Rogers, Bruce Allison, Professor of Mechanical Engineering. (1957)
B.S., Iowa State College, 1916; M.S., Chicago, 1920; Ph.D., Harvard, 1933; Reg. Prof. Engr.

Sandstedt, Carl Edward, Professor Emeritus of Civil Engineering. (1923, 1959)
A.B., Leland Stanford, 1910; M.S., Agricultural and Mechanical College of Texas, 1928; Reg. Prof. Engr.

Silvey, Oscar William, Professor Emeritus of Physics. (1916, 1951)
A.B., Indiana, 1907; A.M., 1910; Ph.D., Chicago, 1915.

Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

Stephenson, Henson Knowlen, Professor of Civil Engineering. (1945, 1957)
B.S., Alabama Polytechnic Institute, 1923; M.S., Michigan, 1931; C.E., Alabama Polytechnic Institute, 1941.

Summey, George, Jr., Professor Emeritus of English. (1922, 1951)
A.B., Southwestern Presbyterian, 1897; M.A., 1898; Ph.D., Columbia, 1919.

Trotter, Ide Peebles, Dean Emeritus of the Graduate School and Professor Emeritus of Agronomy. (1936, 1960)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918; M.S., 1921; Ph.D., Wisconsin, 1933.

Vezey, Edward Earl, Professor of Physics. (1920, 1952)
B.S., Oklahoma Agricultural and Mechanical College, 1910; M.S., Agricultural and Mechanical College of Texas, 1927.

Wapple, Albert Russell, Instructor in Mathematics. (1942)
B.S., California, 1914; M.A., 1915.

Ward, Robert Page, Professor Emeritus of Electrical Engineering. (1925, 1962)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Weaver, Paul, Distinguished Professor of Geology and Geophysics. (1953)
A.B., Columbia, 1908; Reg. Prof. Engr.

Wilcox, George Barton, Professor Emeritus of Education and Psychology. (1920, 1959)
B.S., Sam Houston State Teachers College, 1912; B.S., Agricultural and Mechanical College of Texas, 1923; A.M., Columbia, 1926.

Winkler, Charles Herman, Professor Emeritus of Psychology. (1923, 1946)
B.S., Texas, 1904; M.A., 1914; Ph.D., Missouri, 1916.

Young, Vernon Alphus, Professor of Range and Forestry. (1929, 1946)
B.S., Utah State Agricultural College, 1923; M.S., Iowa State College, 1924; Ph.D., Minnesota, 1929.

## SUMMARY OF THE COLLEGE STAFF AS OF DECEMBER 1, 1962

| | Active | On Leave | Total |
|---|---|---|---|
| College Administrative Officers | 17 | 1 | 18 |
| Full Professors, including Heads of Departments and Divisions | 177 | 5 | 182 |
| Associate Professors | 174 | 4 | 178 |
| Assistant Professors | 168 | 7 | 175 |
| Instructors | 94 | 1 | 95 |
| Other Members of the Academic Council | 9 | 0 | 9 |
| Other Members of the Graduate Faculty | 44 | 0 | 44 |
| Total | 683 | 18 | 701 |

# GENERAL OFFICES

## DEAN OF STUDENTS

James P. Hannigan, B.S., Dean of Students
Colonel Joe E. Davis, B.S., Commandant of Cadets
Colonel Frank L. Elder, B.S., Professor of Military Science
Colonel James F. Starkey, B.S., Professor of Air Science
Bennie A. Zinn, M.S., Director, Student Affairs
J. Wayne Stark, B.A., Director, Memorial Student Center
W. R. Horsley, B.S.F., Director, Placement and Special Services
Dr. C. R. Lyons, M.D., Director, Student Health Services
J. Gordon Gay, M.A., General Secretary Y.M.C.A., Director, Student Welfare Program

## COLLEGE INFORMATION AND PUBLICATIONS

James L. Lindsey, Director, College Information and Publications
Doyle Gougler, Information Representative
Richard Tatum, Information Representative
Henry Alsmeyer, Information Representative
Guy Horton, Information Representative
Joseph Buser, Information Representative

## COMMANDANT'S OFFICE

Joe E. Davis, B.S., Col., Commandant, School of Military Sciences
Frank S. Vaden, Jr., Col., Assistant to the Commandant

## FISCAL OFFICE

Charles A. Roeber, B.A., B.B.A., Business Manager
Walter F. Berndt, B.B.A., C.P.A., Auditor
Herbert C. Hertel, Accountant
George W. Litton, Purchasing Agent
Clifford C. Edge, Cashier

## HOSPITAL

C. R. Lyons, M.D., Director of Student Health Services
K. L. Nelson, M.D., Physician
J. D. Fuselier, M.D., Physician
H. C. McQuaide, M.D., Surgeon
T. O. Melcher, M.D., E.N.T.
T. T. Walton, Jr., M.D., Internal Medicine
W. H. Andrew, Jr., M.D., Radiologist

## LIBRARY

Robert A. Houze, B.S., B.S. in L.S., Library Director
Frederick S. White, B.A., M.S. in L.S., Associate Librarian
Lavelle Castle, B.S., M.L.S., Head, Reference Department
Clara May McFrancis, B.A., B.S. in L.S., Head, Catalogue Department
Nan A. Cardwell, B.S., Veterinary Librarian
Lynne M. Phillips, B.A., M.L.S., Senior Reference Librarian
Donna J. Stuart, B.S., Business Librarian
Dorothy S. Andrew, B.A., Cataloger
Carolyn Ann Miller, B.A., Cataloger
Mayme I. Evans, B.S., B.L.S., Documents Librarian
Lois B. Sperry, B.S., B.S. in L.S., Chemistry Librarian
Mei Ming Hu, B.S., Cataloger
Mary F. Downey, B.S., Junior Reference Librarian
Patricia L. Doyle, B.S., Junior Reference Librarian

## PHYSICAL PLANT

W. H. Badgett, M.S., Manager of Physical Plant
S. F. Crawford, B.S., Assistant Manager
Walter H. Parsons, Jr., B.S., Superintendent of Buildings and Utilities Department
D. R. Thornton, B.S., Superintendent of Grounds Maintenance Department

## OFFICE OF DIRECTOR OF ADMISSIONS AND REGISTRAR

H. Lloyd Heaton, M.S., Director of Admissions and Registrar
Ray G. Perryman, B.S., Associate Registrar
Luther A. Harrison, Jr., B.S., Assistant Registrar
Roy D. Hickman, M.Ed., Assistant Registrar
Caroline M. Mitchell, M.A., Assistant Director of Admissions

## OTHER OFFICES

John G. Peniston, Supervisor of Subsistence
Carl Birdwell, Manager of Exchange Store
E. V. Adams, B.A., M.S., Director of the Band
Robert L. Boone, B.S., M.A., Director of Singing Cadets
Henry C. Foldberg, B.S., Athletic Director
Ernest Langford, B.S., M.S., College Archivist

# AGRICULTURAL INSTRUCTION, RESEARCH, EXTENSION AND SERVICES

**R. E. Patterson, Dean of Agriculture**
**and Director of the Agricultural Experiment Station**
**The A. and M. College of Texas**
**College Station, Texas**

The land-grant college agricultural team operating at College Station and throughout the State includes agricultural instruction by the School of Agriculture, basic and applied research by the Texas Agricultural Experiment Station, education for adults and youth on the farms and ranches and in the homes by the Texas Agricultural Extension Service.

Agricultural programs involving resident instruction, research, and extension are coordinated in fourteen subject-matter departments. The head of each subject-matter department is responsible for the planning and coordination of those areas of activities covered by his department. Heads of departments are responsible directly to the Dean of Agriculture through the Director of Agricultural Instruction for instruction, the Director of the Texas Agricultural Experiment Station for research, and the Director of the Texas Agricultural Extension Service for extension activities. Veterinary research and extension are conducted in the School of Veterinary Medicine under the immediate direction of the School's Dean through the Director of the Texas Agricultural Experiment Station.

Most staff members in the several agricultural departments have dual responsibilities of teaching and research. These, along with extension specialists within a department, are housed together to provide close coordination and cooperation in these activities. In addition to formal instruction to enrolled students, practically all departments and services participate in many specialized short courses and workshops given for adults and young people at College Station and over the State.

The Texas Agricultural Experiment Station also maintains and operates 44 experimental field stations over the State. Research among these locations is coordinated closely with the subject-matter departments and the Main Station at College Station. For administrative purposes, Texas is divided into 12 Extension Service districts, each headed by a district agricultural agent and a district home demonstration agent who supervise the extension programs of the county agents in the district. Associated with the districts and field units are area specialists who are highly trained and experienced in specific problem areas of the district.

Further information on the activities of any department or service may be obtained from its headquarters.

## THE TEXAS AGRICULTURAL EXPERIMENT STATION

**Administration:**

Robert D. Lewis*, Ph.D., Director

Harriott O. Kunkel, Ph.D., Associate Director

Victor E. Schember, M.S., Assistant Director—Business and Fiscal

Alvin A. Price, D.V.M., M.S., Assistant Director—Veterinary Research

Paul J. Lyerly, Ph.D., Research Coordinator, Trans-Pecos Area

**Agricultural Information Office:**

Tad Moses, Agricultural Editor

Herbert O. Evans, B.S., Assistant Editor—News

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*Retired effective 11-30-62.

James W. Potts, M.S., Assistant Editor—News

Helen B. Scott, Assistant Editor—Publications

Marsha E. Martin, Assistant Editor—Publications

**Agricultural Economics and Sociology:**

Tyrus R. Timm, D.P.A., Professor and Head of Department (Agricultural Policy)

Harley Bebout, M.S., Associate Professor (Marketing)

Robert E. Branson, Ph.D., Professor (Marketing)

Sherman K. Fitzgerald, Ph.D., Associate Professor (Sociology)

Dan R. Davis, M.S., Associate Professor (Sociology)

Vance W. Edmondson, Ph.D., Associate Professor (Farm and Ranch Management)

John A. Kincannon, Ph.D., Associate Professor (Marketing)

John G. McNeely, Ph.D., Professor (Marketing)

Aden C. Magee, M.S., Professor (Farm and Ranch Management)

Jarvis E. Miller, Ph.D., Associate Professor (Marketing)

Clarence A. Moore, M.S., Associate Professor (Marketing)

Donald S. Moore, Ph.D., Associate Professor (Farm and Ranch Management)

Bardin H. Nelson, Ph.D., Professor (Sociology)

Daniel Russell, A.M., Professor (Sociology)

Carl E. Shafer, Ph.D., Assistant Professor

Robert L. Skrabanek, Ph.D., Professor (Sociology)

Houston E. Smith, M.S., Junior Economist (Marketing)

Harold B. Sorensen, Ph.D., Associate Professor (Marketing)

Randall Stelly, Ph.D., Associate Professor (Marketing)

Bob H. Stone, M.S., Junior Economist, Tyler, Texas (Farm and Ranch Management)

Kenneth R. Tefertiller, Ph.D., Assistant Professor (Farm and Ranch Management)

James M. Ward, M.S., Assistant Professor (Marketing)

Howard S. Whitney*, Ph.D., Associate Professor (Marketing)

Alvin B. Wooten, Ph.D., Associate Professor (Land Economics)

Donald Workman, M.S., Instructor

**Agricultural Education:**

Earl H. Knebel, D.Ed., Professor and Head of Department

R. M. Craig, B.S., Associate Professor and Coordinator of the Agricultural Adult Specialist Program

John W. Holcomb, M.Ed., Associate Professor

O. M. Holt, M.Ed., Associate Professor

Henry Ross, M.S., Professor

Earl S. Webb, D.Ed., Associate Professor

Carl G. Anderson, M.S., Associate Professor (Farm Management Specialist)

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*Resigned effective 11-12-62.

Joel R. Barton, Jr., B.S., Associate Professor (Machine Specialist)
C. B. Edwards, M.S., Associate Professor (Machine Specialist)
George D. Garretson, B.S., Assistant Professor (Beef Cattle Specialist)
H. D. Brown, M.Ed., Instructor
Joel M. Hillin, M.S., Associate Professor (Dairy Specialist)
Robert C. Jaska, M.S., Assistant Professor (Electrical Specialist)
William M. Oliver, M.Ed., Associate Professor (Beef Cattle Specialist)
William B. Thomas, M.S., Assistant Professor (Swine Specialist)
H. A. Turney, M.S., Assistant Professor (Entomology Specialist)
Harold T. Wiedemann, B.S., Associate Professor (Machine Specialist)

**Agricultural Engineering:**

Price Hobgood, M.S., Professor and Head of Department
William H. Aldred, M.S., Assistant Professor (Farm Power and Machinery)
Billy J. Cochran, B.S., Instructor (Farm Power and Machinery)
Otto R. Kunze, M.S., Associate Professor (Farm Structures) (On leave of absence 9-1-62 to 8-31-63.)
William E. McCune, M.S., Professor (Farm Electrification)
Ralph J. McGinty, M.S., Instructor (Farm Structures)
Nat K. Person, Jr., M.S., Assistant Professor (Crop Drying, Storing, and Processing)
Ernest T. Smerdon, Ph.D., Professor (Soil and Water)
Jerome W. Sorenson, Jr., M.S., Professor (Crop Drying, Storing, and Processing)
Billy R. Stewart, M.S., Assistant Professor (Farm Structures)
Dennis R. Stipe, B.S., Instructor (Farm Electrification)
Lambert H. Wilkes, M.S., Associate Professor (Farm Power and Machinery)

**Animal Husbandry:**

Ogbourne D. Butler, Ph.D., Professor and Head of Department
Thomas C. Cartwright, Ph.D., Professor (Animal Breeding)
Stanley P. Davis, Wool and Mohair Technician (Wool and Mohair)
George F. Ellis, Jr., B.S., Assistant Professor (Animal Breeding)
William C. Ellis, Ph.D., Assistant Professor (Ruminant Nutrition)
Harold W. Franke, B.S., Instructor (Beef Cattle)
Fred Hale, M.S., Professor (Swine Nutrition)
John H. Jones, B.S., Professor (Feeding Investigations)
General T. King, Ph.D., Associate Professor (Meats Investigation)
Clifton M. Laywell, B.S., Instructor (Swine)
John T. Morrow, Ph.D., Assistant Professor (Physiology of Reproduction)
John K. Riggs, M.S., Professor (Beef Cattle Investigation)
Anton M. Sorenson, Jr., Ph.D., Associate Professor (Physiology of Reproduction)
Zerle L. Carpenter, Ph.D., Assistant Professor (Meats Investigation)

**Biochemistry and Nutrition:**

Carl M. Lyman, Ph.D., Professor and Head of Department (Proteins and Amino Acids)

Bennie J. Camp, Ph.D., Associate Professor (Poisonous Plants)

J. R. Couch, Ph.D., Professor (Poultry Nutrition)

Julius W. Dieckert, Ph.D., Associate Professor (Isotope and Radiation Techniques)

Harriott O. Kunkel, Ph.D., Professor (Large Animal Nutrition, Metabolism)

Carter C. Litchfield, Assistant Professor

Paul F. Parks, Ph.D., Assistant Professor

John M. Prescott, Ph.D., Professor (Microorganisms Assays, Bacterial Metabolism)

Raymond Reiser, Ph.D., Professor (Fat Metabolism, Insect Nutrition)

Luther R. Richardson, Ph.D., Professor (Vitamins, Requirements, and Utilization)

David Sharon, Instructor (Peanut Quality Project)

**Dairy Science:**

Isaac W. Rupel, Ph.D., Professor and Head of Department (Dairy Production)

Murray A. Brown, Ph.D., Associate Professor (Dairy Production)

Rudolph E. Leighton, Ph.D., Professor (Dairy Production)
(On leave of absence 9-1-62 to 8-31-63)

Albert V. Moore, Ph.D., Professor (Dairy Manufactures)

Isaac I. Peters, Ph.D., Associate Professor (Dairy Manufactures)

Carl Vanderzant, Ph.D., Professor (Dairy Manufactures)

**Entomology:**

J. C. Gaines, Ph.D., Professor and Head of Department

Perry L. Adkisson, Ph.D., Associate Professor (Cotton Insects)

Alfred H. Alex, B.S., Associate Professor (Apiculture)

Robert K. Ashby, Foulbrood Inspector (Foulbrood Control)

James R. Brazzel, Ph.D., Professor (Cotton Insects)

Claude J. Burgin, B.S., Chief Foulbrood Inspector and State Entomologist (Foulbrood Control)

Horace R. Burke, Ph.D., Assistant Professor (Insect Taxonomy)

Ralph L. Hanna, Ph.D., Associate Professor (Cotton Insects)

Donald R. King, Ph.D., Associate Professor (Pecan and Fruit Insects)

Ronald A. Moeller, B.S., Foulbrood Inspector (Foulbrood Control)

Willis L. Owen, Jr., M.S., Associate Entomologist, Lubbock, Texas (Cotton Insects)

Manning A. Price, M.S., Associate Professor (External Parasites)

Neal M. Randolph, M.S., Associate Professor (Forage Crops Insects)

Henry J. Reinhard, B.S., Professor Emeritus (Insect Taxonomy)

Oliver E. Shipp, M.S., Assistant Professor (Cotton Insects)

James K. Walker, Jr., M.S., Assistant Professor (Cotton Insects)

James N. Weaver, Ph.D., Associate Professor (Apiculture)

**Home Economics:**

Phyllis Drake, M.S., Assistant Professor (Marketing)

Robert L. Hostetler, M.S., Assistant Professor (Food and Nutrition)

Sanford J. Ritchey, Ph.D., Assistant Professor (Food and Nutrition)

Alice C. Stubbs, Ph.D., Associate Professor (Marketing)

**Plant Sciences:**

David W. Rosberg, Ph.D., Professor and Head of Department (Plant Pathology)

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Luther S. Bird, Ph.D., Associate Professor (Plant Pathology)

Walter W. Heck, Ph.D., Associate Professor (Plant Physiology)

Howard E. Joham, Ph.D., Professor (Plant Physiology)

F. R. H. Katterman, Ph.D., Assistant Professor (Plant Physiology)

Rubel G. Langston, Ph.D., Professor (Nuclear Specialist)

Charles S. Miller, Ph.D., Assistant Professor (Plant Physiology)

Page W. Morgan, Ph.D., Assistant Professor (Plant Physiology)

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Walter H. Thames, Jr., Ph.D., Associate Professor (Plant Nematology)

Johannes P. Van Buijtenen, Ph.D., Silviculturist (Forest Genetics)

Robert S. Halliwell, Ph.D., Assistant Professor (Virology)

Leon R. Smith, M.S., Instructor (Plant Pathology)

**Poultry Science:**

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Robert L. Atkinson, Ph.D., Assistant Professor (Turkey Feeding and Breeding)

John W. Bradley, M.S., Farm Superintendent (Poultry Center Operation and Management)

James R. Couch, Ph.D., Professor (Poultry Nutrition)

Charles W. Deyoe, Ph.D., Assistant Professor

Bill H. Doran, B.S., Instructor (Random Sample Tests)

George H. Draper, M.S., Poultry Supervisor (National Poultry Improvement Plan)

Roy C. Fanguy, Ph.D., Assistant Professor (Blood Antigens)

Thomas M. Ferguson, Ph.D., Associate Professor (Physiology and Histopathology)

Frederick A. Gardner, Ph.D., Assistant Professor (Marketing Technology)

Edmond L. Kosarek, B.S., Poultry Supervisor (National Poultry Improvement Plan)

Willie F. Krueger, Ph.D., Professor (Incubation, Breeding, and Population Genetics)

Cecil B. Ryan, Ph.D., Associate Professor (Poultry Environment)

Joe N. Wakefield, B.S., Poultry Supervisor (National Poultry Improvement Plan)

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**Range and Forestry:**

Charles L. Leinweber, Ph.D., Professor and Head of Department (Range Management)

F. W. Gould, Ph.D., Associate Professor and Agrostology Curator

Robert H. Haas, M.S., Assistant Professor (Brush Control)

Donald L. Huss, Ph.D., Assistant Professor (Grazing Management)

Wayne G. McCully, Ph.D., Associate Professor (Grassland Management)

Omer E. Sperry, Ph.D., Professor (Poisonous Range)

Robert D. Larson, B.S., Instructor

Bobby J. Ragsdale, Associate Range Specialist

**Soil and Crop Sciences:**

William O. Trogdon, Ph.D., Professor and Head of Department

### Agronomy Section

Irvin M. Atkins, Ph.D., Agronomist (Small Grains)

J. H. Barton, B.S., Soil and Water Conservation Specialist

W. F. Bennett, Ph.D., Agricultural Chemist (Soil Laboratory)

S. G. Black, M.S., Associate Cotton Specialist (Cotton) (On leave of absence.)

Morris E. Bloodworth, Ph.D., Professor (Soil Physics)

Anton J. Bockholt, M.S., Instructor (Corn Breeding)

John Box, B.S., Agronomist (Fertilizers)

Meta S. Brown, Ph.D., Professor (Cotton Cytogenetics)

Lee C. Coffey, Ph.D., Professor and Agronomist (Foundation Seed)

Jesse W. Collier, Ph.D., Associate Agronomist (Corn Investigation)

Fred C. Elliott, M.S., Agronomist (Cotton)

John E. Endrizzi, Ph.D., Assistant Professor (Cytogenetics)

Flake L. Fisher, Ph.D., Associate Professor (Soil Fertility and Chemistry)

Curtis L. Godfrey, Ph.D., Associate Professor (Soil Classification)

Ethan C. Holt, Ph.D., Professor (Grasses)

George W. Kunze, Ph.D., Professor (Soil Mineralogy)

George G. McBee, M.S., Pasture Specialist (Pastures)

George A. Niles, Ph.D., Assistant Professor (Plant Breeding)

A. C. Novosad, M.S., Seedstocks Operations Manager (Foundation Seed)

Paul S. Pawlisch, Ph.D., Assistant Professor (Cereal Crops)

Lynn P. Pittard, B.S., Assistant Soil and Water Conservation Specialist

Homer E. Rea, B.S., Associate Professor (Weed Control)

Darrell T. Rosenow, M.S., Instructor (Sorghum)

James D. Smith, Ph.D., Assistant Professor (Genetics and Plant Breeding)
Ben R. Spears, M.S., Agronomist (General Agronomy)
Raymond D. Staten, Ph.D., Associate Professor (Legumes)
E. M. Trew, M.S., Agronomist (Pastures)
Eli L. Whiteley, Ph.D., Associate Professor (Soil Physics)
T. G. White, Ph.D., Instructor (Cotton Breeding)
John S. Chapin, Ph.D., Assistant Professor (Fertilizer and Soil Chemistry)
Lewis E. Clark, M.S., Instructor (Foundation Seed)

### Floriculture Section

A. F. DeWerth, M.S., Professor (Floriculture)
Jimmy D. Manring, M.S., Assistant Professor (Floral Plants)
H. C. Thompson, M.S., Instructor (Woody Plants)

### Horticulture Section

Fred R. Brison, M.S., Professor (Plant Propagation)
Homer T. Blackhurst, Ph.D., Professor (Vegetable Breeding and Testing)
Edward E. Burns, Ph.D., Associate Professor (Processing and Post Harvest Physiology)
Effin T. Graham, Ph.D., Assistant Professor (Fruit Breeding)
Bluefford Hancock, B.S., Extension Horticulturist (Fruit)
John E. Larsen, Ph.D., Extension Horticulturist
Donald R. Paterson, Ph.D., Associate Horticulturist (Nutrition, Hormone Physiology)
Durwood E. Speights, B.S., Assistant Professor (Vegetables)
James B. Storey, Ph.D., Associate Professor (Pomology)
Mack C. Fuqua, M.S., Assistant Professor (Vegetable Breeding)

**Farm Service:**

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Freddie A. Wolters, M.E., Superintendent

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Ewing E. Brown, M.S., Research Scientist (Microscopy)
John S. Chapin, Ph.D., Assistant Professor (Fertilizer Analysis)
Jack D. Price, Ph.D., Assistant Professor (Pesticide and Drug Analysis)
Paul F. Parks, Ph.D., Assistant Professor (Feed Analysis)

**Assistant Director for Veterinary Research:**

Alvin A. Price, D.V.M., M.S., Assistant Director for Veterinary Research and Dean of Veterinary Medicine (Physiology)
Charles H. Bridges, D.V.M., Ph.D., Professor of Veterinary Pathology and Head of Department (Pathology)
James W. Dollahite, D.V.M., M.S., Associate Professor (Toxicology)

James B. Henson, D.V.M., M.S., Associate Professor (Pathology)

Kenneth R. Pierce, D.V.M., Assistant Professor (Pathology)

**Veterinary Medicine and Surgery:**

Melvin R. Calliham, D.V.M., Professor and Head of Department (Veterinary Medicine and Surgery)

Harold E. Redmond, D.V.M., Professor (Veterinary Medicine and Surgery)

John C. Hensley, D.V.M., Instructor (Veterinary Medicine and Surgery)

**Veterinary Microbiology:**

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Lamar H. Carroll, D.V.M., Instructor (Microbiology)

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Ted E. Franklin, D.V.M., M.S., Associate Professor (Veterinary Microbiology)

Charles F. Hall, D.V.M., M.S., Associate Professor (Poultry Pathologist)

John W. Huff, D.V.M., M.S., Assistant Professor (Veterinary Microbiology)

Chester F. Meinecke, D.V.M., M.S., Assistant Professor (Poultry Pathologist)

Richard W. Moore, D.V.M., M.S., Associate Professor (Veterinary Microbiology)

**Veterinary Parasitology:**

Richard D. Turk, D.V.M., M.S., Research Coordinator and Professor and Head of Department (Veterinary Parasitology)

Rurel R. Bell, D.V.M., M.S., Associate Professor (Veterinary Parasitology)

Thomas J. Galvin, D.V.M., M.S., Assistant Professor (Veterinary Parasitology)

**Wildlife Management:**

W. B. Davis, Ph.D., Professor and Head of Department (Mammalogy, Herpetology, Ecology)

Richard J. Baldauf, Ph.D., Associate Professor (Fisheries, Biology, Herpetology)

Dilford C. Carter, Ph.D., Instructor (Mammalogy)

Richard B. Davis, Ph.D., Associate Professor (Ecology, Biometry)

Robert L. Spicer, M.S., Instructor (Ecology)

James G. Teer, M.S., Assistant Professor (Ecology, Wildlife Management)

## SUBSTATIONS

**Number 1—Beeville:**

Edward M. Neal, B.S., Superintendent

Billy E. Conrad, M.S., Assistant Agronomist

Lucas Reyes, Junior Agronomist

**Number 2—Tyler:**

Paul R. Johnson, M.S., Superintendent

Shannon E. Carpenter, B.S., Associate Dairy Husbandman

Harry F. Morris, M.S., Horticulturist
Bob H. Stone, M.S., Junior Economist

**Number 3—Angleton:**

James C. Smith, M.S., Superintendent
Kenneth S. Eng., Jr., Ph.D., Assistant Animal Husbandman
Brook E. Jeter, Jr., M.S., Assistant Agronomist
Marvin E. Riewe, M.S., Associate Agronomist

**Number 4—Beaumont:**

Lloyd E. Crane, Ph.D., Superintendent
Clarence C. Bowling, M.S., Assistant Entomologist
John W. Craigen, B.S., Assistant Agronomist
Nathan S. Evatt, M.S., Associate Agronomist
Harry R. Hudgins, M.S., Assistant Agronomist
John E. Scott, M.S., Assistant Agronomist
James W. Stansel, M.S., Assistant Geneticist
Ralph M. Weihing, Ph.D., Agronomist
John R. Wood, M.S., Associate Agronomist

**Number 5—Temple:**

Ralph W. Baird, M.S., Superintendent and Hydraulic Engineer
Earl Burnett, Ph.D. (USDA)
Elton D. Cook, Ph.D., Agronomist
Ralph J. Hervey, M.S., Associate Soil Microbiologist
Ulysses D. Horeelka, B.S., Assistant Agronomist

**Number 6—Denton:**

Daniel I. Dudley, B.S., Superintendent
James H. Gardenhire, M.S., Assistant Agronomist
Pat A. Rich, M.S., Junior Agronomist
Charles O. Spence, M.S., Associate County Agent and Assistant Agronomist

**Number 7—Spur:**

Paul T. Marion, M.S., Superintendent
William P. Hatchett, B.S., Junior Agronomist
Earl D. Robison, B.S., Assistant Range Scientist
William J. Waldrip, Ph.D., Assistant Range Scientist

**Number 8—Lubbock:**

Charles E. Fisher, M.S., Superintendent
Donald L. Jones, M.S., Agronomist Emeritus
Robert E. Karper, Ph.D., Agronomist Emeritus
Jack G. King, M.S., Assistant Agronomist

Jack H. Kyle, Ph.D., Assistant Horticulturist
James S. Newman, M.S., Assistant Agronomist (Irrigation)
W. L. Owen, Jr., M.S., Associate Entomologist
Alexander Pope, Ph.D., Agronomist
Levon L. Ray, M.S., Assistant Agronomist
James H. Valentine, Ph.D., Area Soil Chemist
Harvey J. Walker, M.S., Assistant Agronomist

**Number 9—Trans-Pecos:**

**Livestock Unit**

Aurelious A. Melton, M.S., Associate Animal Husbandman

**Soils and Crops Unit**

Thomas J. Allen, M.A., Assistant Range Scientist
Earnest L. Thaxton, Jr., M.S., Associate Agronomist

**Number 12—Chillicothe:**

Keith A. Lahr, B.S., Assistant Agronomist

**Number 14—Sonora:**

William T. Hardy, D.V.M., Superintendent
Charles L. Livingston, Jr., D.V.M., Assistant Veterinarian
James W. Menzies, Assistant Animal Husbandman
Leo B. Merrill, Ph.D., Associate Range Management

**Number 15—Weslaco:**

Walter R. Cowley, M.S., Superintendent
Jack C. Bailey, B.S., Junior Entomologist
Charles A. Burleson, M.S., Associate Agronomist
Rumaldo T. Correa, M.S., Assistant Horticulturist
Herbert A. Dean, M.S., Associate Entomologist
Cleveland J. Gerard, Ph.D., Associate Soil Physicist
Jack L. Hubbard, M.S., Associate Agronomist
Paul W. Leeper, M.S., Associate Horticulturist
Norman P. Maxwell, M.S., Associate Horticulturist
J. Neal Pratt, Ph.D., Area Agronomist
Michael F. Schuster, B.S., Assistant Entomologist
Bailey Sleeth, Ph.D., Pathologist
Dan A. Wolfenbarger, Ph.D., Associate Entomologist

**Number 16—Iowa Park:**

Lester E. Brooks, B.S., Superintendent
Virgil I. Woodfin, B.S., Junior Horticulturist

**Number 17—Ysleta:**

Paul J. Lyerly, Ph.D., Research Coordinator Trans-Pecos Area and Superintendent
James J. Hefner, M.S., Assistant Plant Pathologist
D. S. Logan, Jr., B.S., Junior Animal Husbandman
Donald E. Longenecker, Ph.D., Associate Agronomist

**Number 18—Prairie View:**

John C. Williams, M.S., Professor and Superintendent
Roscoe W. Lewis, Ph.D., Professor
Emiel W. Owens, Ph.D., Professor
Oliver E. Smith, M.S., Associate Professor
Johnnie J. Woods, M.S., Associate Professor

**Number 19—Winter Haven:**

Bruce A. Perry, Ph.D., Superintendent
John M. Creel, Jr., M.S., Assistant Agronomist
James A. Harding, M.S., Assistant Entomologist

**Number 20—Stephenville:**

Byron C. Langley, M.S., Superintendent
Tom E. Denman, B.S., Associate Horticulturist

**Number 21—Gonzales:**

Arthur A. Camp, Ph.D., Superintendent

**Number 23—McGregor:**

Henry O. Hill, B.S., C.E., Superintendent
William H. Carter, Accountant
Walter E. Kruse, M.S., Assistant Animal Husbandman
Milton J. Norris, Jr., M.S., Agronomist
J. Maurice Shelton, Ph.D., Associate Animal Husbandman and Geneticist
Olin J. Tippitt, B.B.A., Farm Superintendent

**Dairy Investigations, Titus County:**

John A. Lancaster, M.S., Associate Agronomist and Project Supervisor

**East Texas Pasture Investigations, Lufkin:**

Elton K. Crouch, B.S., Associate Animal Husbandman, In Charge

**Fruit Investigations, Montague:**

Uriel A. Randolph, M.S., Associate Horticulturist

**Plant Disease Investigations, Yoakum:**

Arthur L. Harrison, Ph.D., Plant Pathologist
Thurman E. Boswell, M.S., Assistant Plant Pathologist

**Poultry Disease Laboratory:**

Jessie R. White, D.V.M., Associate Poultry Pathologist

**Poultry Disease Investigations, East Texas:**

Robert L. Clifford, Jr., D.V.M., Associate Poultry Pathologist

**Texas College of Arts and Industries, Citrus and Vegetable Training Center:**

Percy W. Rohrbaugh, Ph.D., Professor and Project Director
Julius L. Heinis, Ph.D., Assistant Professor
Richard A. Hensz, M.S., Instructor
Robert F. Leyden, Ph.D., Associate Professor
Rex B. Reinking, M.S., Instructor

**Texas Technological College:**

Ray Verne Billingsley, Ph.D., Associate Professor
James W. Graves, M.S., Assistant Professor (Agricultural Economics)
Clark Harvey, Ph.D., Professor (Agronomy)
Chester C. Jaynes, M.S., Assistant Professor (Agronomy)
Walter B. Rogers, Ph.D., Associate Professor

**Tomato Disease Investigations, Jacksonville:**

Paul A. Young, Ph.D., Plant Pathologist

**Big Spring Field Station, Big Spring:**

James E. Box, Jr., Ph.D., Superintendent (USDA-SWCRD) (Soil Scientist)
Norman H. Welch, M.S., Research Soil Scientist (USDA-SWCRD)

**U. S. D. A. Southwestern Great Plains Field Station:**

Charles E. Van Doren, B.S., Superintendent (USDA-SWCRD)
Norris E. Daniels, M.S., Associate Entomologist
Kenneth B. Porter, Ph.D., Agronomist
James S. Wehrly, Ph.D., Assistant Economist
Allen F. Wiese, Ph.D., Agronomist

**Blacklands Experimental Watershed, Riesel:**

Ralph W. Baird, M.S., Superintendent and Hydraulic Engineer (USDA-SWCRD)

## THE TEXAS AGRICULTURAL EXTENSION SERVICE

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D. C. Pfannstiel, Ph.D., Assistant Director

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Mrs. Gladys D. Kolander, M.S., Home Economics State Home Demonstration Agent
V. G. Young, B.S., State Agricultural Agent
A. H. Walker, M.S., State Agricultural Leader
C. H. Doerge, B.S., Executive Assistant

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Donald V. Bynum, M.A., Area Information Specialist
Robert H. Cullen, Artist
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**Studies and Training:**

Ben D. Cook, Ph.D., Studies and Training Specialist

**Reports:**

Kate Adele Hill, Ph.D., Reports Analyst

**4-H Club:**

Floyd D. Lynch, M.Ed., State 4-H Club Leader
Marshall E. Crouch, B.S., Assistant State 4-H Club Leader
Edward F. Schlutt, Ph.D., Associate State 4-H Club Leader
Peggy Wilsford, B.S., Assistant State 4-H Club Leader
Erma Wines, B.S., Assistant State 4-H Club Leader

**Home Economics:**

Wanda Barkley, M.S., Specialist in Home Management
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Margaret Bracher, M.S., District Agent, District 9
Thelma Casey, B.S., District Agent, District 7
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Mary Cothran, B.S., District Agent, District 5

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Maeona Cox, M.S., Foods and Nutrition Specialist
Mrs. Tom Joyce Cunningham, B.S., District Agent, District 4
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Irene Gromatzky, M.A., District Agent, District 12
Graham Hard, Ph.D., Clothing Specialist
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Mary Routh, M.A., Clothing Specialist
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Charlotte Tompkins, M.Ed., Specialist in Housing and Home Furnishings
Marie Tribble, M.S., Foods and Nutrition Specialist
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Leota White, M.S., District Agent, District 10
Claudia Williams, M.S., Program Specialist
Edith, Lois Wilson, B.S., District Agent, District 1

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Charles K. Baker, M.S., Economist in Farm Organization
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David W. Brown, Ph.D., Economist in Management
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Shannon E. Carpenter, B.S., Area Dairy Specialist

William O. Cawley, M.S., Associate Poultry Husbandman
O. B. Clifton, M.S., Program Specialist
Lee C. Coffey, Ph.D., Agronomist
Joe E. Cole, M.S., Area Agronomist
Edwin H. Cooper, B.S., Specialist in Wildlife Conservation
James W. Davis, Jr., B.S., Dairy Specialist
James A. Deer, M.S., Area Entomologist
James S. Denton, Jr., B.S., Area Farm Management Specialist, District 10
Fred C. Elliott, M.S., Cotton Specialist
Connie F. Garner, M.S., Associate Entomologist
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Garlyn O. Hoffman, M.S., Range Specialist
Roy Lee Huckabee, B.S., District Agent, District 7
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Jack E. Jenkins, B.S., Area Farm Management Specialist, District 4
Sidney L. Jenkins, M.S., Dairy Marketing Specialist
John H. Jones, B.S., Animal Husbandman
Welton H. Jones, B.S., District Agent, District 2
Carroll W. Keese, M.S., Agricultural Engineer—Irrigation
Rex Page Kennedy, M.S., Area Farm Management Specialist, District 12
Robert H. Kensing, B.S., Area Farm Management Specialist, District 7
James E. Kirby, B.S., Economist—Marketing and Policy
Robert C. Lambe, Ph.D., Area Specialist in Plant Pathology
John E. Larsen, Ph.D., Horticulturist—Vegetables
Ripley S. Loftis, B.S., Area Resource Development Specialist, District 5
Thomas D. Longbrake, Area Vegetable Specialist
George G. McBee, M.S., Pasture Specialist
John G. McHaney, M.S., Economist
Lawrence A. Maddox, Jr., B.S., Animal Husbandman
James I. Mallett, B.S., Area Farm Management Specialist, District 5
Garland R. Marshall, B.S., Resource Development Specialist
Ted Martin, B.S., District Agent, District 4
Archie M. Meekma, M.S., Dairy Specialist
Roy J. Miears, M.S., Agronomist
Marshall M. Miller, M.S., Associate Poultry Marketing Specialist
Clarence J. Murphrey, M.S., Area Farm Management Specialist, District 1
Weldon H. Newton, M.S., Assistant Entomologist

Henry P. O'Neal, B.S., Agricultural Engineer
Cecil A. Parker, M.S., Farm Management Specialist
Carol M. Patterson, D.V.M., Veterinarian
Lynn P. Pittard, B.S., Soil and Water Conservation Specialist
Jerold F. Pittman, M.S., Fruit and Vegetable Marketing Specialist
James E. Poore, Assistant District Leader Rodent Control Service
Gordon R. Powell, M.S., Fruit and Vegetable Marketing Specialist
Thomas E. Prater, M.S., Farm Management Specialist
Joseph Neal Pratt, Ph.D., Area Agronomist, Districts 10 and 12
Bobby Joe Ragsdale, M.S., Associate Range Specialist
Beverly G. Reeves, B.S., Cotton Ginning and Mechanization Specialist
Curtis W. Richardson, Ph.D., Area Dairy Specialist
Richard L. Ridgway, Ph.D., Associate Entomologist
Joseph H. Rothe, B.S., District Agent, District 12
Robert Lee Rushing, M.Ed., Area Resource Development Specialist
John J. Seibert, M.S., Area Farm Management Specialist, District 2
Frank W. Sheppard, M.Ed., Resource Development Specialist
David W. Sherrill, B.S., Area Irrigation Specialist, Districts 1 and 2
Raymond D. Siegmund, B.S., District Agent, District 6
James G. Simmons, B.S., District Agent, District 3
Harlan E. Smith, Ph.D., Plant Pathologist
William A. Smith, B.S., Forestry Specialist
Roy W. Snyder, M.S., Meats Specialist
Ben R. Spears, M.S., Agronomist
Charles O. Spence, M.S., Area Agronomist, District 4
John H. Surovik, B.S., District Agent, District 5
Thomas D. Tanksley, Jr., M.Ed., Animal Husbandman
Charles A. Taylor, B.S., Area Farm Management Specialist, District 6
John G. Thomas, M.S., Area Entomologist
Uel D. Thompson, M.S., Animal Husbandman
Ernest M. Trew, Jr., M.S., Pasture Specialist
H. A. Turney, M.S., Area Entomologist
Edward Uvacek, Jr., M.S., Livestock Marketing Specialist
James H. Valentine, M.S., Area Soil Chemist
Silver Whitsett, B.S., District Agent, District 11
Benjamin C. Wormeli, M.S., Poultry Husbandman

## THE TEXAS ENGINEERING EXPERIMENT STATION

(This staff listing does not include employees who are also members of the College teaching staff and whose names appear in the General Faculty section of this catalogue.)

F. J. Benson, M.S., Dean of Engineering
Archie M. Kahan, Ph.D., Director

G. P. Blevins, B.B.A., Executive Assistant
A. C. Wamble, B.S., Research Engineer
Stanley P. Clark, B.S., Associate Research Engineer
E. L. Steele, Ph.D., Associate Research Chemist
W. W. Meinke, Ph.D., Associate Research Chemist
B. D. Deacon, Ph.D., Associate Research Chemist
J. R. Bradley, B.S., Associate Reseach Economist
Ben H. Evans, M.S., Associate Research Architect
E. R. Ibert, M.S., Assistant Research Chemist
L. E. Fite, M.S., Assistant Research Engineer
T. H. Chang, Ph.D., Assistant Research Radiobiologist
J. C. Brusse, B.S., Assistant Research Engineer
C. E. Neelley, B.S., Assistant Research Engineer
C. A. Polaski, B.S., Assistant Research Engineer
R. H. Thompson, B.S., Assistant Research Economist
W. R. Shelton, B.B.A., Assistant Research Economist
H. B. Pace, M.S., Assistant Research Radiobiologist
P. J. A. Zeller, B.S., Assistant Research Engineer
D. Morrison, B.S., Assistant Research Mathematician
A. R. Jennings, M.S., Research Assistant
R. L. Lawson, B.S., Research Assistant
J. T. Lawhon, B.S., Research Assistant
W. J. Harlan, B.B.A., Research Assistant
J. C. Mitchell, B.A., Research Assistant
P. J. Shepard, B.S., Research Assistant
J. C. Forehand, B.A., Research Assistant
D. E. Feltz, B.S., Research Assistant
H. A. Massey, Research Assistant
G. M. Day, M.S., Research Assistant
F. W. Smith, M.S., Operations Chief
L. J. Horn, B.S., Engineering Writer

## THE TEXAS ENGINEERING EXTENSION SERVICE

**Administration:**

Harold D. Bearden, Director
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Frank J. Konecny, Executive Assistant
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Ernest A. Wentrcek, Administrative Assistant

**Vocational Industrial Teacher Education:**

Basil M. Hackney, Teacher Trainer
B.B.A., Baylor, 1940; M.Ed., Agricultural and Mechanical College of Texas, 1951.

Johnnie B. Whiteley, Teacher Trainer
B.S., East Texas State Teachers College, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1957.

Malcolm D. Darrow, Teacher Trainer
B.S., Arizona, 1933.

**Supervisory Development Training:**

Leonard K. Jonas, Chief Instructor
B.S., Trinity, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1958.

Vergil B. Clark, Instructor
B.S., Austin Peay College, 1951; M.S., Tennessee, 1953.

William A. Dow, Instructor
B.S., Texas College of Arts and Industries, 1940.

Elmer F. Frede, Instructor

Wesley B. Mansfield, Instructor
B. A., Baylor, 1942; M.A., 1951.

William A. Poe, Instructor

**Rural Electric Line Crew Training:**

Edward W. Kerlick, Chief Instructor

Grayson E. Baker, Instructor

Hugh M. Parrish, Jr., Instructor

Billy Jack Jones, Instructor

Kenneth E. Rogers, Instructor

Troy S. Watson, Instructor

Don Hall, Instructor (Communications Technicians Training)

**Water and Sewage Works Training:**

Ivan N. Ronhovde, Chief Instructor

James R. Bryan, Instructor

James A. Wilson, Instructor

William A. Mixon, Instructor
B.S., North Texas State College, 1952.

**Instructional Materials Service:**

Richard E. Pulaski, Instructional Materials Writer for Piping Trades
B.S., Agricultural and Mechanical College of Texas, 1960.

P. Albert Washer, Instructional Materials Writer for Petroleum Refining Industry
B.S., Colorado School of Mines, 1926.

**Municipal Electric Employee Training:**

Edward F. Nauert, Instructor

**Police Training:**

Wallace D. Beasley, Chief Instructor
B.S., Abilene Christian College

Edwin E. Powell, Instructor
B.A., Hardin-Simmons, 1932

David C. Betts, Instructor

**Firemen Training:**

Henry D. Smith, Chief Instructor
James A. Bland, Instructor
James R. Dobson, Instructor
John R. Rauch, Instructor
Tom W. Robinson, Instructor
Paul R. Williams, Instructor

**Heavy Construction Equipment Technicians and Operators School:**

Anthony L. Kramer, Chief Instructor
Charlie W. Brannan, Instructor
B.S., LeTourneau Technical Institute, 1949.
Alvin W. Jones, Instructor
B.S., North Texas State Teachers College, 1952.
LaRue W. Jones, Instructor
Tom W. Craig, Instructor
B.S., Olivet College, 1960.
James A. Wallace, Instructor

## THE TEXAS TRANSPORTATION INSTITUTE

**Administration:**

C. J. Keese, M.S., Executive Officer
G. P. Blevins, B.B.A., Executive Assistant

**Asphalt Technology:**

R. N. Traxler, Ph.D., Research Engineer

**Highway Design and Traffic Engineering:**

D. E. Cleveland, Ph.D., Associate Research Engineer
W. R. McCasland, M.S., Associate Research Engineer
N. J. Rowan, M.S., Assistant Research Engineer

**Highway Materials:**

Bob M. Gallaway, M.Eng., Research Engineer
R. A. Jimenez, Ph.D., Associate Research Engineer

**Library Facilities:**

F. S. White, M.S.L.S., Associate Research Librarian

**Pavement Design:**

Frank H. Scrivner, B.S., Research Engineer
L. E. Stark, M.Ed., Research Engineer
W. A. Dunlap, M.S., Assistant Research Engineer
J. C. Armstrong, M.S., Assistant Research Engineer
W. M. Moore, M.S., Assistant Research Engineer

**Structural Research:**

C. H. Samson, Jr., Ph.D., Research Engineer
H. L. Furr, Ph.D., Research Engineer
T. R. Jones, M.S., Research Engineer
T. J. Hirsch, Ph.D., Associate Research Engineer
H. J. Sweet, M.S., Assistant Research Engineer

**Transportation Economics:**

C. V. Wootan, M.S., Associate Research Economist
H. G. Meuth, B.S., Assistant Research Economist
J. L. Buffington, M.S., Assistant Research Economist

**Vegetation Control:**

W. G. McCully, Ph.D., Associate Research Engineer

# THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

In his address at the opening of the college on October 4, 1876, Governor Richard Coke, first Chairman of the Board of Directors, outlined the following basic philosophy on which this college was founded and on which is has grown:

> "The aim and mission of the Agricultural and Mechanical College of Texas is, while preparing the young men of Texas for the high duties of American citizenship, at the same time to train their intelligence in the methods and appliances of science, and their hands for the skills which shall utilize them in the every day pursuits of life . . ."

For 87 years the College has offered to young men superior opportunities for educational development while at the same time remaining dedicated to the principles of the original founders as expressed by Governor Coke:

> "It has been the constant aim of the board . . . to bring down to the lowest possible figure the cost of an education which shall be at the same time thorough, liberal, and practical . . ."

From its small beginning with six students and a faculty of six professors in 1876, the Agricultural and Mechanical College of Texas has been built into one of the great technical schools of the nation, offering classroom training coordinated with the various extension and research centers established on its campus. Each year over 7,000 young men live on its campus; attend its classes; work in its shops, agricultural centers, and laboratories; study in its libraries; participate in its excellent ROTC program; play in its nationally recognized intramural program; and benefit from the many cultural activities, including religious, of the campus and the community. To them it offers broad opportunities for learning a profession and for developing into men capable of thinking intelligently and reasonably so that they can contribute to the growth of a more enlightened society.

## HISTORICAL SKETCH

The Agricultural and Mechanical College of Texas, like the land grant institutions in other states of the Union, owes its origin to the Morrill Act, which was approved by Congress July 2, 1862. This act provided for the donation of a specified amount of public lands to the several states and territories. Proceeds from the sale of these lands were to constitute a perpetual fund, the principal of which should remain forever undiminished. The interest from this fund was to be used for the support of at least one technological college whose objective must be, without excluding other scientific and classical studies and including military tactics, to teach branches of learning pertaining to agriculture and mechanic arts in order to promote the liberal and practical education of the industrial classes in the various pursuits and professions of life. The Legislature of Texas accepted the provisions of the congressional legislation in 1866, and $174,000 was realized from the sale of lands set aside under the Act. Before the College opened, this fund had grown to $209,000 through the addition of accrued interest.

In April, 1871, the Legislature provided for the establishment of the Agricultural and Mechanical College. A commission created for the purpose of locating the college accepted the offer made by the citizens of Brazos County and located the institution on a tract of 2,416 acres of land in that county. The College was formally opened and instruction began on October 4, 1876. Its educational activities have been enlarged as the need for such expansion became evident. At the present time both undergraduate and graduate instruction are offered not only in the fields of agriculture and engineering but also in liberal arts, science, education, business administration, veterinary medicine, and maritime engineering and transportation.

## LOCATION

The community of College Station has grown around the Agricultural and Mechanical College of Texas. This town boasts of churches representing the leading denominations, an excellent public school system, and adequate shopping districts to serve its citizens. Nearby Bryan supplements these advantages.

With the exception of the Maritime Academy, all instruction is conducted on the main campus at College Station. This college community is located 100 miles north of Houston, 100 miles east of Austin, and 170 miles south of Dallas. State highways, Greyhound bus lines, and Continental Airlines serve to connect College Station with the rest of the state. Easterwood Field, the College airport, is located approximately two miles from the campus. First-year students in the Maritime Academy attend classes on the main campus. The following three years of instruction are given at the Texas Maritime Academy Campus, located in Galveston, a city 50 miles south of Houston and on the Gulf of Mexico.

## ACCREDITATION

The Agricultural and Mechanical College of Texas is accredited by the Southern Association of Colleges and Schools, the Association of Texas Colleges and Universities, and the Texas Education Agency. The curricula in architecture are accredited by the National Architectural Accrediting Board and the veterinary medicine degree progam is accredited by the American Veterinary Medical Association Council on Education. All of the undergraduate engineering curricula leading to a degree are accredited by the Engineers' Council for Professional Development. Other accrediting agencies which have approved programs offered at the College are the American Chemical Society and the American Council on Education for Journalism.

## BUILDINGS AND FACILITIES

The purchase from time to time of additional land adjacent to the original tract has increased the land owned by the College in Brazos County to approximately 5,200 acres. Additional holdings include a 3,192-acre plantation in Burleson County used for experimental purposes and 411 acres in Kimble County for the Junction Adjunct of the Agricultural and Mechanical College of Texas.

Recently the College has acquired through the Department of Health, Education, and Welfare, the old Bryan Air Base, consisting of 1,991 acres of land at an appraised value of $360,300 and with buildings and improvements on the land appraised at $3,290,790. This facility was acquired for the use of the A. and M. College of Texas in its program of teaching, research, and extension. In addition to the air base, the College has received from the Department of Health, Education, and Welfare, three acres of land in Galveston at an appraised value of $74,375. A building on this land has been transferred to the College with appraised value of $178,969. This facility is used as a Marine Laboratory.

The physical plant of the College includes buildings with a total valuation of approximately $35,000,000. Included among these buildings are the Nuclear Science Center, the Data Processing Center, the Memorial Student Center, the Cushing Memorial Library, the Gibb Gilchrist Engineering Library, the Richard Coke Building, the G. Rollie White Coliseum, the All Faiths Chapel, the auditorium, hospital, Y.M.C.A., supply store, office buildings, numerous classroom buildings with laboratory and research facilities for the various departments, and many barns providing facilities for handling the various classes of livestock used in demonstration and laboratory work in the Schools of Agriculture and Veterinary Medicine. Recent additions include the W. T. Doherty Petroleum Engineering Building, Heep Hall, the Nuclear Science Center, the Plant Sciences Building, new wings added to the Physics Building and to the ROTC Building; and the remodeling and air conditioning of several of the older buildings on the campus. New facilities for the Division of Architecture are to be completed soon. Twenty-three dormitories are located conveniently on the campus, and two dining halls are in operation. Plans have been made to build additional dormitories. In addition to dormitories for single students, the College operates 778 apartments for married students in areas near the campus.

Athletic facilities consist of a stadium, field house and natatorium, baseball diamond and bleachers, golf course, outdoor swimming pool, and numerous tennis courts and practice fields.

The value of the physical plant has grown to approximately $62,072,000 and a good foundation has been laid at the College for instruction, for investigation, and for extension by means of financial aid secured from both the Congress and the State Legislature.

## SCHOOLS AND DEPARTMENTS

Academic training at the Agricultural and Mechanical College of Texas is supervised by the Schools of Agriculture, Arts and Sciences, Engineering, Military Sciences, Veterinary Medicine, the Texas Maritime Academy, and the Graduate School. The School of Veterinary Medicine is a degree-granting school, admission to which is obtained only after completion of the program in pre-veterinary medicine and selection within the quota to be admitted for the session under consideration. The ROTC program is under the supervision of the School of Military Sciences. The Graduate School assists graduate students in developing and pursuing individual educational programs. More detailed information concerning its administration and the degrees which may be earned will be found in the Bulletin of the Graduate School.

For administrative purposes the departments and divisions of instruction are assigned to the several schools as follows:

### School of Agriculture

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Animal Husbandry
Biochemistry and Nutrition
Dairy Science
Entomology
Plant Sciences
Poultry Science
Range and Forestry
Soil and Crop Sciences
Wildlife Management

### School of Arts and Sciences

Biology
Business Administration
Chemistry
Economics
Education and Psychology
English
Geography
Health and Physical Education
History and Government
Journalism
Mathematics
Modern Languages
Oceanography and Meteorology
Physics

### School of Engineering

Aerospace Engineering
Architecture
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Graphics
Geology and Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Nuclear Engineering
Petroleum Engineering

### School of Military Sciences

Air Science
Military Science
Naval Science (for Cadets in the Texas Maritime Academy)

**School of Veterinary Medicine**

Veterinary Anatomy
Veterinary Medicine and Surgery
Veterinary Microbiology
Veterinary Parasitology
Veterinary Pathology
Veterinary Physiology and Pharmacology
Veterinary Public Health

**Texas Maritime Academy**

Marine Engineering
Marine Transportation and Nautical Science

**Graduate School**

Institute of Statistics

## LIBRARY FACILITIES

**Cushing Memorial Library:** The main College library, which serves also as the research library of the Texas Agricultural Experiment Station and of the Texas Agricultural Extension Service, is in a centrally located, air conditioned building housing a collection of over 330,000 volumes of books, periodicals, government documents, and other library materials.

The library is a federal depository for United States government documents on a selective basis. Over 2,500 periodicals and other serials are currently received, along with 45 state, national, and foreign newspapers. Special attention has been given to obtaining important foreign language periodicals in all areas. Although the library has been developed chiefly along reference and technical lines, a good general reading collection has been assembled. Generous contributions from A. and M. Mothers' Clubs throughout the State have been used to increase substantially the collection of fiction and non-technical popular material. The careful selection of new books in both technical and non-technical areas keeps the collection abreast of modern thought. A well-trained staff of librarians is on duty at all times.

The more important reference works, including indexing and abstracting services, are shelved in the General Reference Room, second floor. State and federal documents are to be found in the Documents Division, third floor. Microfilm and microcard machines are provided for reading materials in this form. Photocopy service is available at a nominal charge.

Individual study carrels are provided in the bookstacks for the use of graduate students and faculty members. With the exception of periodicals, government documents, and certain books temporarily reserved by departments for reference or required reading, all books are loaned for home use for a period of two weeks with the privilege of renewal for the same length of time. Bound volumes of periodicals may be charged out by graduate students for over-night use only, and a one-week charge is given to faculty members.

Normally the library is open from 8 a.m. to 11 p.m., Monday through Friday; Saturday, from 8 a.m. to 12 noon; and Sunday, from 2 p.m. to 11 p.m. On holidays and between terms, the library is open from 8 a.m. to 5 p.m. on weekdays, from 8 a.m. to 12 noon on Saturdays, and is closed on Sundays.

**Texas Engineers Library:** This special branch library, established in 1941 by the Texas State Board of Registration for Professional Engineers in cooperation with the Agricultural and Mechanical College of Texas, is housed in the Gibb Gilchrist Engineering Library Building adjacent to the main college library. The collection consists of over 75,000 volumes of books, periodicals, and other library materials in all areas of engineering. The collection is well balanced but is especially strong in aeronautics, air-conditioning, highway engineering, concrete, hydrology, sanitary engineering, petroleum, and welding. Over 1,400 periodicals and other serials are currently received, including many in foreign languages and some English translations of Soviet technical journals. The library is a depository for all unclassified technical reports of the Atomic Energy Commission.

The library is modern and well-lighted with stacks open to the public. It is open from 8 a.m. to 9 p.m. on weekdays and on Saturdays from 8 a.m. to 12 noon. The library is closed on Sundays.

**Veterinary Library:** This branch library is located at the east end of the first floor of the Veterinary Medicine Building and is open from 8 a.m. to 10 p.m. on weekdays, and from 8 a.m. to 12 noon on Saturdays. The library is closed on Sundays. It is primarily a reference library with 10,000 volumes of books and periodicals in the fields covered by the curriculum in the School of Veterinary Medicine. The library subscribes to 420 American and foreign periodicals and receives pertinent publications from other colleges and experiment stations.

**Architecture Library:** This branch library, located on the fourth floor of the Academic Building, furnishes reading room space and offers reference service from 8 a.m. to 5 p.m. daily and from 7 p.m. to 10 p.m. Tuesdays and Thursdays. It is closed Saturdays and Sundays. The collection, numbering over 4,800 volumes of carefully selected books and periodicals, provides materials in this specialized field for both students and faculty.

**Business Administration Library:** Another branch of the College Library, this collection consists of 4,500 volumes of books and periodicals in the many areas of business administration, such as accounting, insurance, marketing, business law. Over 150 periodicals are currently received and a file of annual reports of corporations is carefully maintained. The library is located in the west end of the first floor of Francis Hall. It is open from 8 a.m. to 5 p.m. weekdays and is closed Saturdays and Sundays.

**Chemistry Library:** This newest branch library, housed on the fourth floor of the Chemistry Building, consists of a collection of 2,600 volumes of books and periodicals which have been carefully selected for their value as reference material for chemistry. The library is open from 8 a.m. to 5 p.m. and from 7 p.m. to 10 p.m. on weekdays. It is closed on Saturdays and Sundays.

**Other Libraries:** Many departments maintain working collections of books and periodicals for use within the departments. Some of the collections are fairly large and well organized; other are small but very well chosen. Use of these libraries is restricted by the departments concerned.

## THE SUMMER SESSION

The Agricultural and Mechanical College of Texas conducts a summer session consisting of two terms of six weeks each for the benefit of both graduate and undergraduate students.

During the summer session courses are offered in most of the departments and are selected to meet the needs of the regular college students. Emphasis is also placed on planning a program for teachers and administrators who wish to do advanced work. A number of departments offer sufficient work for the Master's degree to be earned by attendance during the summer months. Instruction during the summer session is given by members of the A. and M. College faculty and by teachers of prominence from other institutions.

The Agricultural and Mechanical College of Texas is not a coeducational institution. Under present regulations, however, ladies are permitted to attend the summer session as special students, not candidates for degrees.

A separate catalogue for the summer session giving course offerings and other pertinent information is published each spring and is available on request from the Office of the Director of Admissions.

# ADMISSION

## APPLICATION FOR ADMISSION

Any person who desires to apply for admission to the College should write to the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. The applicant should complete the form according to the directions printed thereon and return it to the Admissions Office. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript from each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school attendance only. It is extremely important that these credentials be submitted in advance of registration. If this cannot be done, the applicant should bring them at the opening of the session. Without the credentials the applicant cannot be admitted, and valuable time will be lost if he has to send for them after arriving at the College.

When admission requirements have been satisfied, the Director of Admissions will then send the applicant a letter of acceptance, a room reservation card, and a physcial examination form to be filled out by a physician. The physical examination report must be completed and returned to the Admissions Office prior to the date of registration for classes.

All applicants for admission to the College must be of good moral character, at least sixteen* years old, and free from contagious or infectious diseases. Since the Agricultural and Mechanical College of Texas is not a coeducational institution, only men are admitted to the regular session.

A high school student who is eligible for admission to college and who wishes to enter during the summer may well consider the opportunities of combining study and recreation at the Junction Adjunct of the Agricultural and Mechanical College of Texas. Excellent studying, living, and recreational facilities are available at this beautiful Kimble County campsite in the heart of the Texas hill country. Application blanks for admission to the Adjunct may be obtained from the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas.

## TESTS REQUIRED OF NEW STUDENTS

The A. and M. College of Texas requires certain of the College Entrance Examination Board (CEEB) tests as a part of its admission procedures for those applicants seeking admission to their first semester of college work. Results of these tests are to be used for counseling and placement purposes. The following tests will be required: Scholastic Aptitude Test (SAT), English Composition Achievement Test, Mathematics Achievement Test (Intermediate or Advanced). The College Entrance Examination Board offers these examinations at conveniently located testing centers throughout the United States and in major cities of many foreign countries. Testing dates, locations, and fees required are described in an information bulletin which may be obtained by writing to the College Entrance Examination Board, Box 592, Princeton, New Jersey.

## ADMISSION REQUIREMENTS

An applicant must have graduated from a properly accredited secondary school with a minimum of fifteen units (credits) which are acceptable to the College for entrance purposes. The fifteen acceptable entrance credits shall include four units in English, two units in the social sciences, two units in algebra, one unit in plane geometry, one unit in a natural science, and five acceptable elective units. It is recommended that the five elective units include additional courses from the following subject areas: foreign languages, mathematics, natural sciences, social sciences, and speech. Applicants for admission to engineering and the natural sciences curricula must present trigonometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Such applicants are also strongly advised to present one-half unit in solid geometry. Three units in English and two units in a foreign language may be substituted for the four units required in English. Applicants are advised to take biology, chemistry, or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

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*Texas Maritime Academy students must be at least 17 and not more than 22 years of age on the day of registration.

Superior students with unit deficiencies will be considered on the basis of their merit.

The applicant who does not meet the unit requirements or who falls within the lowest quarter of his high school class may meet requirements on the basis of a satisfactory showing on the results of his CEEB tests.

In addition to the normal requirements for admission to the College, a student seeking to enroll in the Texas Maritime Academy must satisfy the following requirements:

1. He must be a citizen of the United States.
2. He must be unmarried. (Regulations require that the Maritime Cadet remain unmarried until graduation.)

## ADMISSION BY EXAMINATION

Any or all of the scholarship requirements for admission may be met by passing the entrance examinations. These will be held at the beginning of each semester under the supervision of the College authorities and will cover all the subjects required or accepted for admission as outlined above. Candidates desiring to take examinations at the College should notify the Director of Admissions well in advance of registration.

## ADMISSION BY INDIVIDUAL APPROVAL

An applicant over twenty-one years of age who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted without examination, subject to the following requirements:

1. He must make application on the official entrance blanks.

2. He must furnish evidence that his preparation is substantially equivalent to that required of other applicants and that he possesses the ability and seriousness of purpose necessary to pursue his studies with profit to himself and to the satisfaction of the College.

## ADMISSION OF COLLEGE TRANSFER STUDENTS

Admission to advanced standing may be granted to an applicant who has satisfied the requirements as outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for each of the last two semesters, or for the total record if less than two semesters of attendance, a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

On the basis of these credentials, credit will be given for work completed with a grade of C or better, so far as the work is equivalent in character and extent to similar work at A. and M. College. Credits given in transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory. Work completed with a grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the subject area.

An applicant whose record does not meet the minimum admission requirements may be considered upon merit after the student has shown satisfactory performance on tests administered at this college.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

## ADMISSION OF SPECIAL STUDENTS

A limited number of young men over twenty-one years of age may be admitted to the College as special students, not candidates for a degree, subject to the following regulations:

1. The applicant must show good reason for not taking a regular course and must submit satisfactory evidence that he is prepared to profit by the special studies he wishes to pursue.

2. Record of his previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) his experience; (2) a plan of study, enumerating the courses he desires to pursue; and (3) the purpose or end expected to be accomplished by his study.

## ADMISSION OF NONRESIDENT STUDENTS

A limited number of nonresident students who have attended another college or university may be accepted so long as facilities are available. Such students must have maintained a grade point ratio of 1.00 (C-average) or better on all courses undertaken in addition to a grade point ratio of 1.00 (C-average) or better for each of the last two semesters.

A limited number of out-of-state high school graduates may be accepted so long as facilities are available. Such students, in addition to satisfying all other admission requirements, must have made superior records in high school.

Students who are admitted to the College in one curriculum may not be permitted to change to another which is restricted except under the same conditions as apply to new students.

The status of the residence of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. as a student. His residence may not thereafter be changed by him, but, in the case of a minor, it may be changed by his parents, should they move to and become legal residents of the State and maintain such residence for at least one calendar year.

## REGISTRATION

Every student is required to register when he first enters the College and thereafter at the beginning of each semester. Dates of registration for the session of 1963-64 are shown on pages 2-3 of this catalogue.

Registration is not complete until the student pays his fees for the ensuing semester; reports, if not a civilian student, to ROTC headquarters for assignment to an organization; reports to the Chief of Housing for assignment to a room or to report his place of residence if not living in a dormitory; and returns his assignment card, properly approved, to the Registrar's Office, where his receipt showing payment of fees will be stamped "Registered in the Registrar's Office."

## EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students the total cost should range between $950.00 and $1,250.00. In general these amounts include four types of expenses: fees payable to the College Fiscal Department; textbooks and supplies; clothing, and military uniform to supplement that furnished by the College; and incidental expenses, estimated to range between $100.00 and $200.00 depending upon the individual concerned. Nonresident students should increase these estimated expenses by $300.00 to cover the nonresident tuition fee.

The total expenses for returning students during a regular session should be somewhat less that those amounts indicated for new students.

### PAYMENTS

Payments to the Fiscal Department may be made by cashier's check, personal check, or money order, payable to the Agricultural and Mechanical College of Texas. All checks, money orders, and drafts are accepted subject to final payment.

### FEES

The fees for the session of 1963-64 may be changed because of economic conditions or legislative requirements. They are currently set as shown below:

| | First Semester to Begin Sept. 13, 1963 | Second Semester to Begin Jan. 31, 1964 |
|---|---|---|
| 1. Tuition | $ 50.00* | $ 50.00* |
| 2. Student Services | 18.00 | 18.00 |
| 3. Property Deposit | 10.00 | |
| 4. Student Activities | 23.80 | |
| 5. Board Plus Tax | 179.01 | 177.48 |
| 6. Room Rent | 90.00 | 80.00 |
| 7. Laundry | 17.19 | 17.27 |
| 8. Room Deposit | 20.00 | |
| 9. Identification Card | 1.00 | |
| Total | $409.00 | $342.75 |
| 10. Laboratory Fees Per Course | $ 2.00–8.00 | $ 2.00–8.00 |
| 11. ROTC Uniform Handling | 8.00 | |
| 12. Physical Education Service | 8.00 | 8.00 |
| 13. Parking Permit | 3.00 | 3.00 |

For additional information concerning expenses for students in the Texas Maritime Academy, see the Texas Maritime Academy section of this catalogue.

All fees are payable in full at the beginning of the semester except board and laundry, which may be paid by installments. A $1.00 service charge for each installment will be assessed.

A $1.00 charge per day will be made on installment payments made after the due date. Students who are delinquent with installment payments for five days will be dropped from the rolls of the College.

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*The tuition fee for nonresident students is $200.00 per semester.

INSTALLMENT PAYING: The general expenses listed above may be paid in installments as follows:

## FIRST SEMESTER

First Installment—Payable September 13-14

| | |
|---|---|
| Tuition | $ 50.00 |
| Student Services | 18.00 |
| Property Deposit | 10.00 |
| Student Activities | 23.80 |
| Board plus Tax | 58.14 |
| Room Rent | 90.00 |
| Laundry | 5.56 |
| Room Deposit | 20.00 |
| Identification Card | 1.00 |
| Service Charge | 1.00 |
| TOTAL—Through October 20 | $277.50 |

plus fees listed as items No. 10 through 13 on pages 80 and 83.

Second Installment—Payable by October 20

| | |
|---|---|
| Board plus Tax | $ 45.90 |
| Laundry | 4.10 |
| Service Charge | 1.00 |
| TOTAL—Through November 19 | $ 51.00 |

Third Installment—Payable by November 19

| | |
|---|---|
| Board plus Tax | $48.96 |
| Laundry | 5.04 |
| Service Charge | 1.00 |
| TOTAL—Through January 8 | $ 55.00 |

Fourth Installment—Payable by January 8

| | |
|---|---|
| Board plus Tax | $ 26.01 |
| Laundry | 2.49 |
| Service Charge | 1.00 |
| TOTAL—Through January 25 | $ 29.50 |
| TOTAL INSTALLMENTS | $413.00 |

## SECOND SEMESTER

First Installment—Payable January 31-February 1

| | |
|---|---|
| Tuition | $ 50.00 |
| Student Services | 18.00 |
| Property Deposit | -0- |
| Student Activities | -0- |
| Board plus Tax | 52.02 |
| Room Rent | 80.00 |
| Laundry | 4.98 |
| Room Deposit | -0- |
| Identification Card | -0- |
| Service Charge | 1.00 |
| TOTAL—Through March 4 | $206.00 |

plus fees listed as items No. 10 through 13 on pages 80 and 83.

Second Installment—Payable by March 4

| | |
|---|---|
| Board plus Tax | $ 45.90 |
| Laundry | 4.85 |
| Service Charge | 1.00 |
| TOTAL—Through April 8 | $ 51.75 |

Third Installment—Payable by April 8

| | |
|---|---|
| Board plus Tax | $ 42.84 |
| Laundry | 4.16 |
| Service Charge | 1.00 |
| TOTAL—Through May 6 | $ 48.00 |

Fourth Installment—Payable by March 6

| | |
|---|---|
| Board plus Tax | $ 36.72 |
| Laundry | 3.28 |
| Service Charge | 1.00 |
| TOTAL—Through May 30 | $ 41.00 |
| TOTAL INSTALLMENTS | $346.75 |

## EXPLANATION OF FEES

### 1. Tuition

The tuition fee, fixed by State law, is $50.00 per semester for the Texas resident and $200.00 per semester for the non-Texas resident. Payment of this fee entitles the student to register for 12 or more semester hours.

Former students who in either semester do not register on the days set apart for that purpose pay an additional tuition fee of $4.00.

The fee for courses audited or visited by students shall be the same as for courses for which credit is given.

### 2. Student Services

The student services fee is required of all students and covers the services at the College Hospital and the Memorial Student Center and the intramural program. Surgical operations and charges for consultations with outside physicians requested by parents are not included. The services of the College Hospital do not include the physical examination required of entering students.

### 3. Property Deposit

The property deposit of $10.00 is charged to insure against loss for damage, breakage, etc., and is required by law. It is to be paid by all students and is refundable when graduating or leaving the College.

### 4. Student Activities

The student activities fee is optional. It entitles the student to receive the **Battalion** newspaper, the College yearbook, and the magazine published by the school in which the student is registered. It also entitles him to admission to all intercollegiate athletic events played at the College under the auspices of the Athletic Department, to the Town Hall program, and to the Great Issues series.

For students who do not pay this optional fee for the fall semester, the spring semester activities fee will be $12.55.

### 5. Board

All students living in the dormitories are required to pay for board, room rent, and laundry. Changes from dormitory student to day student will be made only on the last day of installment payments for board and laundry.

### 6. Room Rent

The total amount of the room rent for the semester must be paid at the time of registration. This charge for room rent includes heat, light, and cleaning the corridors but not the rooms.

Rooms are furnished with single bedsteads, mattresses, desks and chairs, and dressers. Students are expected to furnish their own pillows, bedding, and linens.

### 7. Laundry

All students living in the dormitories are required to pay laundry fees.

### 8. Room Deposit

The room deposit of $20.00 must be paid by all students who will reside in the College dormitories before a room reservation or assignment can be made; this amount will be retained as a deposit against damage and breakage. The deposit may be refunded upon request prior to August 15 for the fall semester and January 15 for the spring semester for those students not planning to enroll. Refunds may be made in accordance with the College policy for those students graduating or withdrawing from school after clearance by the Office of Student Affairs.

### 9. Identification Card

All students must have an identification card. This card is used in registration procedures, collection of fees, cashing of checks, laundry service, etc.

### 10. Laboratory Fees

A laboratory fee ranging in amount from $2.00 to $8.00 is charged for each laboratory course each semester.

### 11. ROTC Uniform Handling

Students enrolled in military, air, or naval science are required to pay a uniform handling charge of $8.00.

### 12. Physical Education Service

The College will furnish the necessary physical education uniform, except shoes, to all students taking required physical education and to others who wish to use facilities of the Physical Education Department. All such students will be required to pay a handling charge of $8.00 per semester for this service. The handling charge includes the cost of laundering the physical education uniform after each use. This amount also covers the cost of bowling, swimming, and golf for those students enrolled in these physical education courses.

### 13. Parking Permit

All students driving motor vehicles on the campus must pay a fee of $3.00 per semester for registration and parking.

## OTHER EXPENSES

**New Student Program:** Freshman students reporting for the New Student Program in the fall semester will pay an additional amount of $4.70 for room, board, and laundry.

**Textbooks and Supplies:** The cost of textbooks and supplies will vary with the quality of items purchased and with the course of study to be pursued. Engineering students can expect to pay an amount ranging between $80.00 and $120.00; other students will probably pay from $40.00 to $60.00. These amounts are estimates for the combined fall and spring semesters.

**Uniforms:** Members of the ROTC will be furnished most of their uniform equipment. Cadets will find it necessary to supplement the uniform issued by purchasing the following articles, the approximate cost of which at the College Exchange Store is as follows: one pair of cotton khaki trousers ($5.95); collar ornaments ($5.95); one cotton khaki officer style shirt ($6.95); one wool elastique garrison cap ($2.95); one cotton khaki garrison cap ($1.25); four pairs of black cotton socks ($1.00 per pair); one fatigue cap ($1.95); one pair white cotton gloves ($0.95); one pair black leather gloves ($3.95). Cadets will pay a handling charge of $8.00 per year to cover the cost of issuing, receiving, and record keeping of uniforms issued. Since only approved articles of uniform may be worn, new students should purchase uniforms after arrival at the College.

To defray the cost of additional billing and delayed handling, a charge of ten per cent of the value of uniform articles turned in subsequent to five days following the close of school, with a minimum charge of $1.00, will be made.

**Other Items:** The College operates a store for the purpose of supplying necessary articles to students. The store carries in stock textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area. Upon recommendation of the Exchange Store Advisory Board, any profit created from the operations of the Exchange Store may be used for student welfare and other purposes of benefit to the entire student body.

## AUDITING OR VISITING FEE

The fee for courses audited or visited by students shall be the same as for courses for which credit is given.

## REFUNDS

Any student withdrawing officially (a) during the first week of class work in a semester will receive a refund of four-fifths of the tuition fee; (b) during the second week of class work, three-fifths; (c) during the third week of class work, two-fifths; (d) during the fourth week of class work, one-fifth; (e) after the fourth week of class work, nothing. No refunds will be made until ten days have elapsed from the time the fees were paid.

Students withdrawing from a laboratory course during the first week of class work in a semester will receive a refund of 100% of the laboratory fee paid. Students withdrawing from a laboratory course after the first week of class work in a semester shall not be entitled to a refund.

Students withdrawing officially from school during the first week in a semester will receive a refund of 100% of the Student Services and Physical Education Service fees. A student withdrawing after the first week in a semester will receive no refund.

A refund of board and laundry payment will not be made unless there is a consecutive absence of not less than ten days due to illness of the student or a member of his family, or for some other unavoidable cause.

There will be no refund of room rent after classes start.

Students withdrawing during the first week of the Fall Semester will receive a 100% refund of the Student Activities fee. Students withdrawing after the first week of the Fall Semester and before the end of the first week of the Spring Semester, will receive a refund of $6.55 and will be entitled to receive a copy of the student annual. Students withdrawing after the first week of the Spring Semester will receive no refund.

Students not enrolled in the first semester and withdrawing during the first week of the Spring Semester will receive a 100% refund of the Student Activities fee. No refund will be made to students withdrawing after the first week, but the student will be entitled to receive a copy of the student annual.

## REDUCTIONS

No reductions will be made in charges for board, room rent, or laundry in case of entrance within ten days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten days of a semester or the last ten days for which payment is made.

### UNPAID CHECKS

If a check or draft accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of $2.00.

### DUPLICATE RECEIPTS

Duplicate receipts for fees paid by students will be issued on payment of twenty-five cents.

### DAY STUDENTS

Day students pay all specified fees and charges except board (optional), laundry, and room rent.

### PART-TIME STUDENTS

The tuition fee for students registering for less than 12 credit hours will be reduced by $4.00 for each credit hour less than 12 with a minimum tuition fee of $15.00.

### NONRESIDENT STUDENTS

In accordance with the regulations of the governing board of the College, the following definitions, general policies, and regulations will apply to nonresident students. Any variance therefrom will depend upon the facts in the individual case and the interpretations placed thereon by the admissions officer.

The residence status of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. College as a student except as provided by law. This policy shall apply to both graduate and undergraduate students regardless of any scholarships, student assistantships, or graduate assistantships that may be granted to any student.

In compliance with the State law, the tuition fee for nonresident students is $200.00 per semester. A nonresident student is hereby defined to be a student of less than twenty-one years of age, living away from his family and whose family resides in another state, or whose family has not resided in Texas for the twelve months immediately preceding the date of registration; or a student of twenty-one years of age or over, who resides out of the State or who has not been a resident of the State twelve months subsequent to his twenty-first birthday or for the twelve months immediately preceding the date of registration. The tuition fee for nonresident students registering for less than 12 credit hours will be reduced by $16.00 for each credit hour less than 12.

The term "residence" as used herein means "domicile" and the term "resided in" means "domiciled in."

The legal residence of one who is under twenty-one years of age is that of the father. Upon death of the father, the legal residence of the minor is that of the mother. Upon divorce of the parents, the residence of the minor is determined by the legal residence of the person to whom custody is granted by the court. In the absence of any grant of custody, the residence of the father continues to control. Upon death of both parents, the legal residence of the minor continues to be that of the last surviving parent until he becomes twenty-one unless he makes his home with his grandparents, whereupon their residence is controlling.

Individuals who have come from without the state of Texas and who register in an educational institution of the State prior to having resided in the State for a period of twelve months shall be classified as nonresident students; and such nonresident student classification shall be presumed to be correct as long as the residence of such individuals in the State is during their attendance at educational institutions, regardless of whether such individuals have become qualified voters, have registered motor vehicles and paid personal property taxes thereon, have obtained Texas drivers' licenses, or have otherwise attempted to establish legal residence within the State.

A student under twenty-one years of age shall not be classified as a resident student until his parents shall have maintained legal residence ("domicile") in this state for at least twelve months. A student under twenty-one years of age whose parents leave the State to reside in another state normally shall be classified immediately as a nonresident student. It shall be the responsibility and duty of the student to submit legal evidence of any change of residence.

Individuals of twenty-one years of age or less whose families have not resided in Texas for the twelve months immediately preceding the date of registration shall be classified as nonresident students regardless of whether such individuals have become the legal wards of residents of Texas or have been adopted by residents of Texas while such individuals are attending educational institutions in Texas or within a year prior to such an attendance or under circumstances indicating that such guardianship or adoption was for the purpose of obtaining status as a resident student.

All individuals who have come from without the state of Texas and who are within the State primarily for educational purposes are classified as nonresidents. Registration in an educational institution in the State is evidence that residence is primarily for educational purposes even though such individuals may have become qualified voters, have become legal wards of residents of Texas, have been adopted by residents of Texas, or have otherwise attempted to establish legal residence within the State.

A student twenty-one years of age or older who comes from without the State and desires to establish a status as a resident student must have resided in the State as a legal resident for a period of at least twelve months and must have the intention of establishing a permanent residence within the State during that entire period.

All aliens shall be classified as nonresident students except that an alien who has applied for naturalization in the United States and has received his first citizenship papers or immigrant cards shall have the same privilege of qualifying as a resident student as a citizen of the United States. The twelve months' residence required to establish the status of a resident student shall not begin until after such first citizenship papers or immigrant cards have been received by the alien.

Officers, enlisted personnel, selectees or draftees of Army, Army Reserve, National Guard, Air Force, Air Force Reserve, Navy, Naval Reserve, or the Marine Corps of the United States who are stationed in Texas by assignment to duty within the borders of this state, shall be permitted to enroll themselves, their husband or wife as the case may be, and their children by paying the tuition fees and other fees or charges provided for regular residents of the state of Texas, without regard to the length of time such officers, enlisted personnel, selectees, or draftees have been stationed on active duty within the State. This provision shall extend only during active military service in Texas; and upon such member of the Armed Services being transferred outside the state of Texas, he and his children shall be classified as to residence under the second paragraph of these regulations. Any student claiming the privilege of this section shall submit at each registration a statement by the commanding officer of the post or station at which he or his parent is on active duty verifying the fact of his or his parent's military status.

The residence of a wife is that of her husband; therefore a woman resident of Texas who marries a nonresident shall be classified as a nonresident and shall pay the nonresident fee for registration subsequent to her marriage. A nonresident woman student who marries a resident of Texas is entitled to be classified immediately as a resident student and is entitled to pay the resident fee for all subsequent registrations.

Appointment as a member of the teaching or research staffs or the holding of a fellowship, scholarship, or assistantship shall not affect a student's residence status or the tuition fee to be paid.

It shall be the responsibility of the student to pay the correct fee at the beginning of each semester or term for which he may register, and a penalty of $10.00 shall be assessed for failure to pay the proper fee.

### VOCATIONAL REHABILITATION AID

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and required fees to certain students in Texas colleges. Eligibility for such assistance is based on permanent physical disabilities and other chronic conditions.

Application should be made to the Texas Education Agency, Division of Vocational Rehabilitation, Room 505, Varisco Building, Bryan, Texas, or to C. G. Fairchild, Director, Division of Vocational Rehabilitation, Capitol Station, Austin 11, Texas.

## SCHOLARSHIPS, FELLOWSHIPS, AND AWARDS

The College scholarship program is administered by a Faculty Scholarship Committee. As authorized by the Board of Directors, this committee is composed of the Dean of Instruction, who serves as chairman; the Secretary of the Former Students Association; and a representative, appointed by the President, from the Counseling and Testing Center and from each of the undergraduate schools of the College.

In general there are three types of scholarships available: (1) Valedictory Scholarships and Opportunity Awards, representing those limited to entering freshmen; (2) scholarships designed for the more advanced undergradute students; and (3) fellowships and grants-in-aid for graduate students.

The over-all program is designed to encourage and reward scholastic effort on the part of all students; to enable outstanding students to do the best work of which they are capable by removing financial handicaps; and to enable capable and ambitious young men who might be denied a college education for financial reasons only to secure that education at the Agricultural and Mechanical College of Texas.

### Valedictory Scholarships

A scholarship is offered to the valedictorian, if a boy, who graduates from a secondary school accredited by the Texas Education Agency and who qualifies for admission to the College. The successful applicant must make the highest record among all students, boys and girls, graduating that calendar year, including winter, spring, and summer graduating classes, and must be certified to the College through the Texas Education Agency. The scholarship is valid beginning with the first summer session or long session semester after the holder's graduation from high school. The financial benefit is exemption from payment of tuition fees ($25.00 for each six week term of the summer session, and $50.00 each semester of the long session, not to exceed a grand total of $400.00) and laboratory fees for a period equivalent to four academic years (eight semesters) under the following terms and conditions:

1. The student's initial enrollment must be in this College.

2. To be eligible for the award any semester or summer term, the student must schedule at least 15 hours in a semester of the long session or 6 hours in a six-week term of the summer session.

3. On such a schedule the student must make a grade point ratio of at least 1.00 during the first year in college to be eligible for the award the

succeeding year. After his first year, he must make a grade point ratio of at least 2.00 to be eligible to use the scholarship in the succeeding years.

4. The student's eligibility for any part of the scholarship shall not extend beyond the end of four calendar years from the time of high school graduation.

5. The conduct of the scholarship holder must be satisfactory to the faculty.

6. The student must be a legal resident of the State of Texas for school purposes.

7. Any student who may have lost his scholarship for academic reasons may have it reactivated on the basis of his performance during any twelve-week summer session or long session semester.

### The Opportunity Award Program

This program annually provides approximately 100 four-year scholarships to high school graduates of Texas who are capable of outstanding scholastic achievement and who need financial assistance to attend college. The awards are made possible through the A. and M. College Development Fund and by interested citizens and organizations of the State. Financial benefits range in value from $800 to $1600 with recipients receiving from $200 to $400 each year for four years plus an opportunity for additional earnings from student employment if necessary. Most of the awards are unrestricted as to course of study or degree objective in college.

Graduates of accredited high schools of Texas who have not attended another college or university, who are legal residents of this state, and who need financial assistance to attend college are eligible to make application for an Opportunity Award Scholarship. To be considered for such a scholarship, an applicant must satisfy the admission requirements of the College; must make formal application for an award on forms provided by the College; and must enter the state-wide competition which is held each spring. Selections are made by the Faculty Scholarships Committee on the basis of the applicant's academic record in high school; his scores on competitive examinations; his evidence of initiative, leadership, and other traits of good character; and his need for financial assistance. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Scholarships Committee.

This program is usually announced officially during the latter part of the fall semester each year. Official announcements and application blanks are distributed over the State at that time and are also made available to those interested upon request. Requests for additional information and application forms should be addressed to the Secretary, Faculty Scholarships Committee, Office of the Registrar, A. and M. College of Texas, College Station, Texas.

### Scholarships for Advanced Undergraduate Students

One-year scholarships ranging in value from $100 to $750 are available to outstanding students already enrolled in the College. Some of these are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted in this regard. Recipients are usually chosen by the Faculty Scholarships Committee in April or May each year with the basis of selection determined by the nature and intent of the award.

Some of these scholarships are given as "rewards for a job well done" and are intended to recognize outstanding scholastic achievement or other meritorious accomplishments. As such, they not only benefit financially the student concerned but also encourage and promote scholastic attainment and leadership on the part of other individuals. In addition to the reward type of scholarship, others are made available to outstanding students who must have financial assistance in order to remain in school or to do a high quality of work while enrolled. It is the general objective of this type of award to encourage every scholar to go as far as his abilities and ambition will carry him.

Information regarding scholarships for advanced undergraduate students may be obtained from the Secretary, Faculty Scholarships Committee, Office of the Registrar.

# STUDENT LIFE

## LEADERSHIP AND GUIDANCE

Leadership and guidance in the area of student life are the responsibilities of the Dean of Students. Responsibility for the enforcement of College regulations lies with the Director of Student Affairs for civilian students and with the Commandant of Cadets for military students. Appeals by civilians may be made to the Director of Student Affairs and by military students to the Commandant.

The student government of the College is carried out through the Student Senate. The office of the Advisor of the Student Senate is the Dean of Students' Office, YMCA Building.

The Civilian Student Council serves as the official governing body for civilian students, with responsibility in those areas affecting civilian students only. The Council is advised by the Department of Student Affairs.

## BASIC POLICY

The rules of conduct by which every student is expected to live while attending the A. and M. College of Texas are contained in the Basic Policy, a copy of which follows:

The Board of Directors finds it necessary to assert the basic principles to govern student life and staff-student relationship at the A. and M. College of Texas.

The College accepts responsibility for the curricular work of the student and for his conduct and development. The term "College" as used here embraces the Board of Directors, the President, the faculty, all personnel of the A. and M. system, the student body, former students, and all the worthy traditions of the institution.

Every student is expected at all times to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of his time toward an education.

Every student has rights which are to be respected. They include the right of respect for personal feelings, the right of freedom from indignity of any type, the right of freedom from control by any person except as may be in accord with published rules and regulations of the College, and the right to make the best use of his time and his talents toward the objective which brought him to this institution. No officer or student, regardless of position or rank, shall violate these rights. No custom or regulation in conflict will be allowed to prevail.

It shall be the duty of every person employed by this institution to conform to this policy; to cooperate with all agencies of the College and with the student body, individually and collectively, in carrying out its provisions. Personal responsibility in this respect will be primary.

## THE OFFICE OF THE DEAN OF STUDENTS

Responsibility for the development and welfare of the student in areas other than academic is placed with the Office of the Dean of Students. Activities are provided which help to meet the physical, emotional, social, and spiritual needs of students.

Student personnel departments and offices under the direction of the Dean of Students include the following:

- Commandant (Headquarters of the Corps of Cadets)
- Army ROTC
- Air Force ROTC
- Naval ROTC (Maritime Academy Cadets)
- Student Affairs, Veterans Advisory Service, Foreign Student Advisor, Campus Security, Housing and Civilian Counselors
- Memorial Student Center
- Placement of Graduates, Student Labor and Loan, Short Courses
- Student Health Services and Campus Hospital
- Y.M.C.A. and the All Faiths Chapel

## STUDENT AFFAIRS

The Department of Student Affairs includes the activities and functions of the Veterans Advisors Office, the Housing Office, Civilian Dormitory Counselors, the Foreign Student Advisor's Office, and the Campus Security Office.

## VETERANS ADVISORY SERVICE

The A. and M. College of Texas provides a Veterans Advisor to assist ex-servicemen with their problems. Assistance is given also to war orphans in securing payment from the Veterans Administration.

The office of the Veterans Advisor is located on the ground floor of the YMCA Building.

## HOUSING AND MEALS

**Single Students:** Unless they are living with their families, all students are required to live in College-owned dormitories on the campus. Dormitories are designed especially to meet the student's needs of living and study.

Reservations are filed in the order in which they are received and will be held only until 3 p.m. of the regular registration day. Reservations made by students who do not complete their registration on the regular registration day by 5 p.m. may be cancelled, and the space will be assigned to another applicant.

A new student may file a room reservation as soon as he has been accepted by the Director of Admissions and Registrar. A room reservation card will be mailed to him with his acceptance letter, and the form should be completed as directed and returned to the Fiscal Department with a check or money order for $20.00. The $20.00 will be deposited to the student's account, where it will remain until he moves off campus, withdraws from the College, or graduates, when it will be refunded if all of his college accounts are "clear." The Fiscal Department will send the reservation card and receipt to the Housing Office, which will verify dormitory assignment to the student. Should a student decide that he cannot enroll at the beginning of the ensuing semester and so notify the Housing Office, the reservation will be canceled. If the cancellation is made prior to August 15 for the fall semester or January 15 for the spring semester, the $20.00 deposit will be refunded; but if cancellation is made after these dates, the $20.00 will be retained. When the student reports to the campus for registration, he will secure his room assignment and room key at the Housing Office, ground floor, YMCA Building.

All students residing on the campus are required to take their meals in one of the two dining halls on the campus, operated by the Subsistence Department of the Business Office. Each has a seating capacity of 4,000 and furnishes the students at cost well-balanced meals prepared under the direction of experienced supervisors.

**Married Students:** The College has apartments for married students, consisting of 353 furnished two-bedroom apartments, 312 furnished one-bedroom apartments, and 113 unfurnished two-bedroom apartments. More complete information and application forms may be obtained from the Housing Office, ground floor, YMCA Building.

## FOREIGN STUDENT ADVISOR

The Office of the Foreign Student Advisor is located in Room 27, Milner Hall. Information relative to immigration regulations and assistance with problems peculiar to students from other lands may be obtained from this staff member.

## REGISTRATION OF MOTOR VEHICLES

All students and employees who drive motor vehicles on the campus must have them registered in the Office of Campus Security, Ground Floor, YMCA Building, within 48 hours of the time that they are brought on the campus.

Students are assigned parking areas according to their housing assignment. Cars must be parked in these designated areas during the regular classroom hours.

## MEMORIAL STUDENT CENTER STUDENT PROGRAMS

Dedicated to the memory of the men of the Agricultural and Mechanical College of Texas who gave their lives during World Wars I and II, the Memorial Student Center was erected to foster the social, cultural, and spiritual phases of student life.

General facilities of the Memorial Student Center include a dining room, cafeteria, snack bar, gift shop, telephone and telegraph center, barber shop, 66 guest rooms, travel agency, check cashing and information center, student organizations banking center, and United States Post Office. Recreational facilities include bowling lanes, table tennis area, game room, browsing library, piano room, and record playing rooms. A large number of meetings, receptions, exhibits, and social affairs given by the student and staff organizations of the College are held at the Center.

Included in a special activities program of the Memorial Student Center Directorate are the following special interest committees: Music, Dance, Creative Arts, Radio, Camera, Browsing Library, Travel, Texas A. and M. Student Leadership Training Program, Great Issues, Flying Kadets, Bowling, Table Tennis, Chess, Public Relations, Personnel, Evaluation, and the Student Conference on National Affairs. These activities are governed by the Memorial Student Center Council, composed of nine students, five faculty members, and two former students, with a student as president of the Council. The Directorate, which is composed of the various committees, plans and directs the entire program. Many positions of leadership are open in this student program for those who join the committee activities at an early date.

The Memorial Student Center Student Program Staff is charged with counseling and fiscal operation of many student activities. It sponsors cultural, recreational, and entertainment activities on the campus, including the campus movie program, music activities, social activities; serves as banker for all recognized student organizations (approximately 325); is the agency of the College to officially recognize student organizations; and serves as financial advisor, "Club Aid" for departmental student organizations, student government, and other co-curricular activities.

The Memorial Student Center Building Cashier provides banking service for the numerous student organizations on the campus and for the Memorial Student Center businesses. The Cashier's window is also headquarters for the sale of season and individual tickets for various campus presentations.

**Clubs:** Many opportunities exist for students interested in co-curricular club activities. There are more than 300 organizations on the campus, ranging in interest from hometown clubs to technical societies. Their activities include discussion meetings, movies, smokers, barbecues, dances, and inspection trips.

**Dances and Social Affairs:** Social life at the Agricultural and Mechanical College of Texas is highlighted by numerous dances and social functions. The various classes, military units, and civilian organizations sponsor dances. In addition, certain all-school social functions are held for which outstanding name bands provide music. The most elaborate function is the traditional Senior Ring Dance and Banquet, when graduating seniors and their guests dance to an outstanding orchestra of the year. All parties and other social functions, whether held on or off the campus, must be approved by the College.

**Town Hall:** The Town Hall series includes the best obtainable artists in the fields of music, dance, and theatre. Since its inception, the Town Hall roster has boasted such names as Bob Hope, Doris Day, Oscar Levant, Marge and Gower Champion, the Ballet Russe de Monte Carlo, Fred Waring, Ray Conniff, the Kingston Trio, the Houston Symphony, the Boston Pops Orchestra, several Broadway musicals, and many other famous entertainment features. Activity fees and the sale of season and individual tickets make it possible to bring these outstanding programs to the student body at low prices.

**Singing Cadets:** This widely known singing unit consists of more than sixty students, both civilian and military. The group has appeared in many southwestern cities and in Mexico, on numerous broadcasts and telecasts, and on various other entertainment programs. Membership is selected from the entire student body by auditions held early in the fall semester.

**Dance Band:** The All-College Dance Band is made up of both civilian and military students. Each year the band plays for various dances and shows on and off the campus. Dance tours are made throughout the State to play for A. and M. Club dances. Members are chosen by competitive audition at the beginning of the fall semester, and rehearsals are held once a week in Guion Hall.

**Music Hall:** For students interested in music, a building with practice rooms and pianos is provided. It is open for use from 8 a.m. until 5 p.m., but may be used by special permission at night for instrumental or vocal groups.

**Guion Hall Theater:** The Guion Hall Theater is operated on weekends to provide economical and convenient movie entertainment for the student body and College staff. Although good pictures are shown, they are usually second-run shows in order to keep costs as low as possible. Guion Hall is also used as a meeting place, a concert hall, and for dramatic presentations.

**The Grove:** The Grove is an outdoor concrete recreational area with a stage, utilized by the Memorial Student Center for the scheduling of movies, intramural athletics, concerts, dances, picnics, games, and festivals.

## THE AGGIE PLAYERS

This is a student organization that offers active participation in theater work for college credit or as extracurricular activity. The Aggie Players present three to five major dramatic productions a year, and any student is invited to join.

## DEBATE ACTIVITIES

The Aggie Discussion and Debate Club is sponsored jointly by Student Activities and the Department of English. Activities include the annual A. and M. debate tournament, six other tournaments, poetry reading, extemporaneous speaking, and oratory. Interested students should come to the Department of English.

## COLLEGE HEALTH SERVICES

The College Hospital has been remodeled recently to give more efficient service. Besides infirmary space for over 100 patients, the facilities now include a complete physiotherapy department as well as new laboratory and x-ray departments. The medical staff includes specialists in the fields of medicine, surgery, radiology, and ear, nose, and throat.

The Clinic is open from 8 a.m. to 5 p.m. on weekdays and from 8 a.m. to 12 noon on Saturdays. The Student Services fee provides for clinic visits, diagnostic examinations, care for acute illness, emergency care for accidents, and 10 days of infirmary care each semester in cases requiring hospitalization. Routine medications for acute illnesses, x-rays, laboratory tests, and local ambulance service are also furnished the student without charge. A staff of Registered Nurses is on duty, with a staff physician on call, to care for emergency cases at any hour.

Students of the Texas Maritime Academy are provided free Public Health Service in Galveston.

The water of the College is supplied through a College-owned water supply system and comes from four deep wells located nine miles northwest of the College campus. As a part of the sanitary work carried on throughout the entire year, the College laboratories make bacteriological checks of this water supply and of the milk supply at regular intervals.

The College is particularly concerned with the maintenance of the health and physical development of its students. It provides one of the finest indoor swimming pools in the State, as well as tennis courts, a golf course, athletic fields, and physical training.

## RELIGIOUS ACTIVITIES

The A. and M. College of Texas is non-sectarian, but its high objectives cannot be achieved unless its educational program is founded on a solid religious life. Divorced from the spiritual aspirations of the individual and of the group, education cannot be complete. The basic purpose of education is a normal religious life to the end that young people may be not only more efficient but better motivated by a sense of duty and obligation. Thus, in an atmosphere of tolerance and mutual respect, every student is encouraged to maintain his ties with the religious group to which such association may be made most fruitful.

**Young Men's Christian Association:** The YMCA endeavors to develop the full, rounded man by emphasizing growth in mind, body, and spirit. Because of the effect of the YMCA on the lives of many students, it holds a coveted spot in the hearts of Aggies.

The varied and vigorous program of the YMCA depends on student participation, initiative, and leadership. The program is centered around stimulating the moral and spiritual lives of the students and includes religious discussions, Bible study, conferences, intercollegiate visits, steak fries, leadership development, Freshman Camp, United Nations Club, Preparation for Successful Marriage Forums, and many other worthwhile projects.

**All Faiths Chapel:** The beautiful All Faiths Chapel, a gift of the Former Students, is made of Austin limestone and glass, and is modern in design. In addition to providing the opportunity for individual meditation and prayer and serving as a meeting place for small religious groups, the Chapel makes available a library of religious books and affords accommodations for small weddings, funerals, memorial services, baptisms, vesper services, and other religious rites. The Chapel is open at all hours for meditation and prayer.

**Religious Services:** In addition to the college religious life staff, there are ten churches near the campus whose primary purpose is to serve the spiritual needs of the students. The campus religious leadership is deeply conscious that the students are in perhaps the most formative period of their lives and feel keenly the responsibility for their spiritual development.

The programs of the respective churches are aimed primarily to meet the student needs. Many of the churches have distinct student departments with specialized leadership whose sole responsibility is that of ministering to the students. The pastors of the churches also give as much time as is necessary to the students for personal counseling.

The churches serving the campus have a program similar to that of the home church with an expanded young people's department and dominant emphasis upon student interests. In addition to the special student emphasis, they have the customary Sunday worship periods, church schools, and young people's organizations promoted to stimulate clear and constructive thinking in the important field of religion. The student departments are expanded to offer wholesome recreation and social life and social service.

**Religious Emphasis Week:** One week during each year is designated officially by the College administration as Religious Emphasis Week, in which the entire College cooperates. The administration of the College, knowing the value of developing the spiritual aspects of the personality of the student, encourages all students to attend the services of their choice.

**Courses in Religious Education:** The Baptist General Convention of Texas; the Church of Christ; the Episcopal Church, Diocese of Texas; the B'nai B'rith Hillel Foundation; the American Lutheran Church; the Lutheran Church, Missouri Synod; the Methodist Church; the Presbyterian Church, U.S.; the Presbyterian Church, U.P.U.S.A.; and the Roman Catholic Church, Diocese of Austin, upon approval of their respective boards, have been authorized to offer courses in Religious Education open to students of junior and senior classification.

A maximum of six semester hours from the following courses in religious education may be applied toward a degree from the College.

**305. Old Testament Character Studies. (1-0). Credit 1.**
Through a chronological study of many characters in the Old Testament, the student becomes acquainted with experiences in the lives of these characters, through which is revealed the righteous and omnipotent God of the Old Testament.

**306. New Testament Character Studies. (1-0). Credit 1.**
After a brief introduction to the New Testament giving the political, social, moral and religious situation at the time of Jesus' birth, the course will pursue a character study of key personalities in the New Testament and their contribution to the Christian system of thought.

**309. Early Old Testament History. (1-0). Credit 1.**
Story of Bible history as recorded in first five books; study divided into five periods between the Creation and the Wilderness wanderings.

**310. Later Old Testament History. (2-0). Credit 2.**
Periods of Bible history studied include: conquest of Canaan, the Judges, the united Kingdom, the divided Kingdom, Judah alone, the exile, and return from exile.

**311. The Synoptic Gospels. (2-0). Credit 2.**

A study of the first three Gospels, Matthew, Mark and Luke, with emphasis upon the contribution of each to our knowledge of the life and teachings of Jesus.

**312. The Gospel of John. (1-0). Credit 1.**

This course is a detailed study of the life and teachings of Jesus as reported in the fourth Gospel. Special attention is given to interpretation of Jewish customs and institutions for the non-Jewish (Greek) readers.

**313. Survey of the New Testament. (2-0). Credit 2.**

Each book of the New Testament is studied with reference to its author, purpose, content, unique characteristics, and the historical background which provided the occasion for its writing.

**314. Survey of the Old Testament. (3-0). Credit 3.**

Each book of the Old Testament is studied in light of the historical background of the Hebrew people and the development of their relationship with God.

**318. The Book of Acts. (1-0). Credit 1.**

Chapter by chapter study of Acts; founding and spread of church in Jerusalem, Judea, Samaria; Paul's travels; church among the Gentiles.

**319. The Epistles of Paul. (2-0). Credit 2.**

A study of the life and thought of Paul as found in the Book of Acts and Pauline correspondence. A history of the primitive church as reflected in these writings.

**320. The Book of Revelation. (1-0). Credit 1.**

This book is studied in the light of the persecution of Christians in the Roman Empire, and as an apocalyptic writing to serve in strengthening their faith in and loyalty to Christ and to his teaching.

**321. The General Epistles. (1-0). Credit 1.**

A study of the "open letters" written by James, John, Peter, and Jude to the early Christian churches, comparing their messages with the recorded words of Jesus relative to the situation and problems of their day and ours.

**323. The Life of Jesus. (3-0). Credit 3.**

In this course, the four Gospels are studied with the passages in the four books arranged in chronological sequence so as to give a connected account of the life of Christ and to reveal similarities and differences in the four books.

**324. The Prophetic Movement in the Old Testament. (3-0). Credit 3.**

A history of the prophetic movement from the 8th century B.C. to the time of the Maccabees. An interesting study of the contribution of the prophets to the religious thinking of the day, and the permanent value of their teachings.

**325. The Book of Job. (2-0). Credit 2.**

The book of Job is one of the great books of all time. It offers in interesting form a thorough study of the problem of suffering.

**326. The Psalms. (2-0). Credit 2.**

This study of the book of Psalms includes a glance at Hebrew poetry, at the source and background of certain of the Psalms, and a study of their beauty of structure and composition and of their interpretation.

**327. An Introduction to the Bible. (2-0). Credit 2.**

A course to acquaint the student with the Bible showing its unity and the continuity existing between the Old and New Testaments by a study of representative sections of both Testaments together with their historical settings and their relationship to each other.

**329. Proverbs. (1-0). Credit 1.**

This study of the book of Proverbs includes authorship, date of writing, and a close study of the practical wisdom contained in the proverbs, of which the book is full.

**330. Ecclesiastes and the Song of Solomon. (1-0). Credit 1.**

A study of two neglected books of the Bible—their contents, interpretation, and significance.

**335. Comparative Religions. (2-0). Credit 2.**

A study of the most popular contemporary religions of the world as channels through which men have tried to find the meaning of life and to relate themselves to its values. It includes Buddhism, Confucianism, Mohammedanism, Judaism, and Christianity.

## CORPS ACTIVITIES

The aim of the Corps of Cadets is to offer a sound collegiate education in both mind and body under strictly military discipline. The method of administration of this military discipline and its extension to all phases of the cadet's non-academic life are distinctive at the Agricultural and Mechanical College of Texas. Students are organized along military lines and observe military practices at all times. They habitually wear the prescribed uniform on the campus and live in rooms assigned to them on the basis of their military organization. From reveille to taps, every hour of the cadet's time is accounted for. The regular habits of study and living thus formed, the attention to duty, obedience to authority, and love for order inculcated are considered among the most valuable features of the military education. While some of the graduates enter the military profession, hundreds in all walks of civil life attest to the high value of the training received at this institution.

An integral part of the military system is the requirement of freshmen of certain extra duties and activities at the beginning of their college career. During the early weeks of their first year the cadets have special drills under their cadet officers and follow a rigorous program of behavior designed to improve their military posture and to inculcate early respect for upperclassmen who are their military superiors. These special activities do not interfere unduly with the freshman's academic program nor usurp his prerogatives as a private individual. They are supervised by responsible cadet officers under the general supervision of the Commandant and are to be distinguished from irresponsible hazing which is forbidden by the rules and regulations of the College.

In keeping with the democratic ideals of the Agricultural and Mechanical College of Texas, the formation of exclusive societies or fraternities, membership in which is based on other requirements than individual worth and achievement, is forbidden. When new cadets report to the college, all are at once put in uniform and, as far as possible, all artificial distinctions based on wealth, position, or influence are minimized and the cadet is encouraged to achieve his place by individual merit. All cadets live under practically identical conditions, and all are rated by the same standards, but there is a wide range of opportunity for each to develop in accordance with his needs and aptitudes.

Among Cadet Corps organizations is the Ross Volunteer Company, a military group composed of outstanding cadets. This unit was organized in 1887 by Colonel T. M. Scott, business manager of the College, for the purpose of banding together the most proficient military men in A. and M. College into a precision drill team. They were first called the Scott Volunteers. The name was changed to Ross Volunteers in 1891 to honor Governor Lawrence Sullivan Ross, who in that year became President of the College. It was originally the plan of the organization to change its name in honor of each succeeding president of the College, but in 1902, at President Harrington's request, the idea was dropped and the name Ross Volunteers made permanent.

There are several important cadet organizations that do not come under a specific classification. The following should be mentioned as having distinctive functions in cadet life: the Aggie Band, the largest college military band in the United States; the Rifle and Pistol Teams, which compete in national matches; and the Freshman Drill Team, a precision military drill team.

Students of the Texas Maritime Academy are an integral part of the Corps of Cadets.

## STUDENT PUBLICATIONS

The Student Publications program at A. and M. College provides students with excellent opportunities to learn and practice magazine and newspaper technique. Management of the department is vested in the Director of Student Publications and the Student Publications Board, composed of faculty members from each of the degree-granting schools.

The following seven publications are issued, each supervised by a student editor:

**The Battalion:** This student newspaper is issued four days a week for campus readers and residents of the city of College Station. Staff members have excellent opportunities to learn newspaper management and responsibility in addition to newswriting and editing. Junior and senior editors receive salaries commensurate with their responsibilities.

**The Aggieland:** The yearbook of the student body has the largest staff requirement in Student Publications, and recruits from all classes are welcomed to document the school year's activities.

**The Engineer:** Published six times annually by students in the School of Engineering, this journal promotes scholarly investigation and technical writing.

**The Agriculturist:** Students in the School of Agriculture produce a quarterly magazine which concerns itself with articles related to the field of agriculture.

**The Southwestern Veterinarian:** Produced quarterly by students of the School of Veterinary Medicine, this publication is rated as one of the nation's leading college veterinary journals.

**The A & M Review:** A magazine of campus-wide interest is edited by students in the School of Arts and Sciences and published four times a year.

**Student Directory:** Each year the Office of Student Publications issues a college directory of students, faculty, and staff.

Participation in Student Publications is not limited to any course of study or student classification. All interested students should contact the department, which is located on the ground floor of the YMCA Building.

## THE TEXAS AGGIE BAND

The Texas Aggie Band is the official band of the A. and M. College. It is often referred to as the "pulse of the Spirit of Aggieland" and furnishes music for military ceremonies, yell practices, and athletic events.

The Texas Aggie Band is housed as a military unit of the Corps of Cadets, and band members may pursue either the Army or Air Force ROTC program. Band membership is not limited by the course of study to be taken. As the College has no School of Music, the total rehearsal time is limited to approximately four and one-half hours per week.

Interested new students should indicate on the advanced room reservation card their desire to participate. No try-outs are necessary. Although a large number of College-owned and government-owned instruments are available for issue, it is advised that students having their own instruments bring them.

## INTRAMURAL ATHLETICS

Intramural athletics feature contests between military units and between civilian organizations. The intramural program, which is one of the most outstanding in the country, includes basketball, bowling, cross country, fencing, flag football, golf, gymnastics, handball, horseshoes, rifle shooting, softball, swimming and diving, table tennis, tennis, track, volleyball, and wrestling. Ample physical facilities are available to accommodate these comprehensive intramural activities.

## INTERCOLLEGIATE ATHLETICS

The A. and M. College of Texas is a member of the Southwest Athletic Conference, which embraces eight leading major colleges and universities—the University of Texas, the Agricultural and Mechanical College of Texas, Baylor University, Rice University, Texas Christian University, Southern Methodist University, the University of Arkansas, and Texas Technological College. The intercollegiate program includes football, baseball, basketball, track, cross country, swimming, tennis, and golf. Varsity teams in each sport are known as the Texas Aggies, and the uniforms used by the players are in the school's colors, maroon and white.

Center of athletics is Kyle Field, which contains the football stadium seating 35,460. Temporary bleachers and cinder path boxes give a total capacity of 41,594. A quarter-mile cinder track with a 220-yard straightaway and a baseball diamond with 4,000 seats afford excellent facilities for these sports. G. Rollie White Coliseum, seating 8,500, is available for basketball and other indoor College events. The P. L. Downs, Jr., Natatorium, with swimming pool 100 by 60 feet and with lockers and showers, has seats for 600 spectators. A new outdoor olympic type swimming pool has greatly expanded the facilities for this popular sport. An 18-hole golf course available to students is located on the campus.

## OFFICE OF PLACEMENT AND SPECIAL SERVICES

### Employment for Graduates

The College feels a definite responsibility for the proper professional placement of its graduates. Assistance in fulfilling this responsibility is shared jointly by the faculty and the Office of Placement and Special Services. The function of this office is to maintain active contact with prospective employers of the graduating students and alumni in such manner that well qualified men may be directed to suitable job opportunities.

Supplementing assistance in securing professional employment, this office cooperates with other College departments in an educational program designed to acquaint undergraduates with opportunities in the fields of work in which they are interested, and to advise on problems which will be met in entering professional employment. Assistance is given students in preparing credentials for submission to employers as well as advice on the proper approach in seeking a job. Assistance is also given undergraduates in securing employment during the summer vacation.

Seniors and graduate students who wish to make use of these services are requested to file a record of their qualifications with the Placement and Special Services Office early in the year in which their college work will be completed. There is no charge for this service other than for personal leaflets, which are prepared at cost on request.

### Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Every effort is made to develop new employment opportunities outside of the College. To become eligible for employment, a student must have been admitted to the College by the Director of Admissions and have an accepted application on file with the Office of Student Labor and Loans. Continued eligibility for employment is contingent on satisfactory performance of work and on the ability of the student to maintain good scholastic standing.

Ordinarily only those students whose financial resources are limited may be considered for employment. Assignments are made primarily on the basis of need and sincerity of purpose.

### Loan Funds

The College is participating in the National Defense Education Act Student Loan program. Available funds are limited, and applications should be made not later than June 15 for the next school year or December 1 for the next Spring semester. Inquiries should be addressed to the Registrar's Office.

The Association of Former Students administers other substantial loan funds which are available to students who have completed at least one year of attendance.

Smaller emergency loans are available through the Office of Student Labor to students already enrolled. Emergency type small loans, limited to $20.00 for 30 days, are available to students on presentation of identification card and current fee slip. No charge is made, but donations are accepted.

Loan eligibility is based upon the student's satisfactory record, and the amount of each loan depends upon the student's actual needs.

### Special Services

Special services of the Office of Placement and Special Services include the administration of the Short Courses program.

## ACADEMIC REGULATIONS

Certain academic regulations have been set up by the faculty for the purpose of assisting the student to secure the maximum benefit from his studies. These regulations, contained in the copy of **College Regulations** given to each student when he enters the College, serve as a guide in such important matters as choice of course and subjects, methods of study, attendance, examinations, promotion, and graduation.

By means of reports at regular intervals, frequent conferences with the deans, the Registrar, Office of the Dean of Students, and members of the teaching staff, the authorities of the College keep in close touch with the student's progress; and such advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with his studies, the student may at any time be dropped from the rolls of the College.

The College reserves the right to modify the curricula or withdraw any course when it appears wise to do so.

### DEGREES OFFERED

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Arts (B.A.)
Bachelor of Business Administration (B.B.A.)
Bachelor of Science (B.S.)
Bachelor of Architecture (B.Arch.)

Bachelor of Petroleum Engineering (B.P.E.)
Doctor of Veterinary Medicine (D.V.M.)
Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Engineering (D.Eng.)
Doctor of Philosophy (Ph.D.)

On the basic of acceptable professional experience, the following professonal degrees in engineering are offered to graduates of the College:

Aerospace Engineer (Aero.E.)
Agricultural Engineer (A.E.)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

## REQUIREMENTS FOR A BACCALAUREATE DEGREE

The diploma of the College, with the appropriate degree, will be granted to the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. He must complete one of the regular courses of study leading to a degree.

2. The total number of grade points earned at this institution in courses applied to this degree must equal at least the number of hours which he carried in courses at this institution which are applied to this degree. Grades of F or WF shall be included, except such grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated satisfactorily during the student's first four semesters in college. Grades of WP shall be excluded.

3. The total number of grade points earned at this institution in courses in his major department applicable to this degree must equal at least the number of hours which he carried at this institution in his major department which are applied to this degree. Grades of F and WF shall be included, but grades of WP shall be excluded.

4. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed such courses need not be repeated.

5. Effective with the class graduating in January 1964, a candidate for a baccalaureate degree is required to take the Graduate Record Examination in the semester preceding the semester or term in which he expects to receive his degree.

6. Students of the Texas Maritime Academy are required to pass an examination administered by the United States Coast Guard for Third Mate or Third Assistant Engineer, United States Merchant Marine.

7. He must have settled all financial obligations to the College.

8. He must be formally recommended for graduation by the Academic Council after consideration of his complete record.

9. Unless registered in absentia or excused by his dean, he must be present in person at the graduation exercises.

These requirements must be completed and all grades on record in the Registrar's Office not later than 5 p.m. on Thursday preceding Commencement Day.

Requirements for an advanced degree are outlined in the Graduate Bulletin.

## CANDIDACY FOR A DEGREE

During the semester or summer session preceding the conferring of the degree, a student must be officially registered in the College. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term, in which the student expects to complete his requirements for graduation.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must fulfill the following two conditions:

1. He must be registered for the courses necessary to complete the requirements of his curriculum.

2. For work of his final semester or summer term, he must not lack a grade point ratio in excess of 1.50 in his major field and for his over-all program of studies in order to meet the grade point requirement for graduation.

## RESIDENCE REQUIREMENT

A candidate for a baccalaureate degree must complete the requirements of the final year's work of his curriculum in residence at this institution except that six semester hours may be accepted in transfer. However, in every case the student must complete at least thirty-six semester hours of upper level work of the last two years of his curriculum at this institution.

In satisfying baccalaureate degree requirements, a junior college student transferring to this college must complete in residence at A. and M. College at least the equivalent of the total semester hours required in the junior and senior years of his curriculum minus six hours. The work completed at A. and M. College must include thirty-six semester hours of upper level work of the last two years of his curriculum.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses taught in the freshman and sophomore years at this institution.

A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum at A. and M. College and at least one year at a Class A medical school, with a minimum total of 137 acceptable semester hours, subject to the usual grade point requirement.

A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum at A. and M. College and at least one year at a Class A dental school with a minimum total of 137 acceptable semester hours, subject to the usual grade point requirement.

A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year prelaw curriculum at A. and M. College and one year at an accredited law school with a minimum total of 137 acceptable semester hours, subject to the usual grade point requirement.

## GRADUATION WITH HONORS

All candidates for baccalaureate or Doctor of Veterinary Medicine degrees are eligible for graduation with "Honors." Graduation with Honors shall be based upon the average of all grades made by a student on the courses taken at A. and M. College. Those students who complete less than seventy-five semester hours of credit at A. and M. College must show a grade point ratio on all work done elsewhere equal to that required at A. and M. College for the appropriate category for honors. They shall be designated as follows:

(1). With High Honors: To be graduated with "High Honors" a student must have a grade point ratio of 2.80 or above.

(2). With Honors: A student may be graduated with "Honors" if his grade point ratio is within the range of 2.50 to 2.79 inclusive.

## GRADUATE RECORD EXAMINATION

Effective with the class graduating in January 1964, a candidate for a baccalaureate degree is required to take the Graduate Record Examination in the semester preceding the semester or term in which he expects to receive his degree. The completion of this examination is considered as one of his requirements for a degree.

## TWO DEGREES

A candidate for a second Bachelor's degree must have been in residence at least two academic years and must have completed all the essential work of the second curriculum not covered in the first; in all such cases the total amount required must be at least 30 semester hours additional to the greater number required for either degree.

## CHANGE OF CURRICULUM

Applications for change of curriculum shall be passed upon by the deans of the schools and heads of divisions concerned. A student under 21 years of age must have the written consent of his parent or guardian.

At the time of the change, the dean of the school or head of the division to which the transfer is being made will indicate any courses on the student's record which are to be excluded from requirements for his new curriculum and will so advise the Registrar.

## CREDIT BY EXAMINATION

College credit may be given for satisfactory scores on the College Board Advanced Placement Examinations in the following subjects:

**American History**
**Biology**
**Chemistry**
**English Composition**
**French**
**German**
**Mathematics**
**Spanish**

The College offers its own series of advanced placement examinations. These may be taken instead of the College Board Advanced Placement Examinations to obtain college credit. There is no charge for taking these examinations. The Agricultural and Mechanical College of Texas offers credit by examination in the following courses:

**Biology** 101, 107, 115
**Chemistry** 101, 102
**English** 103, 104
**History** 105, 106
**Mathematics** 102, 103
**Modern Language** 101, 102, 103, 104, 105, 106, 109, 110

The Director of Admissions and Registrar will furnish all necessary information to anyone interested in obtaining credit by means of these examinations.

## TRANSFER OF CREDITS

As a general policy credit will be given in transfer for work completed with a grade of C or better at another properly accredited institution. Work completed with the grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the same subject area. Any student desiring to validate work done elsewhere should discuss with the Registrar the conditions necessary for validation of his particular work and secure from him authorization for such action. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory.

Work done in an institution not properly accredited must be validated by one of the two methods of validation already mentioned before it can be transferred.

Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

## CORRESPONDENCE COURSES

The Agricultural and Mechanical College of Texas offers no correspondence courses. A student in residence at this institution will be permitted to receive undergraduate credit for correspondence courses taken elsewhere only when written permission has been granted in advance by the dean of his school.

Credit earned in a course completed by correspondence will be accepted only after a validating examination has been passed unless the final examination is taken under the supervision of the Registrar at this college. An exception will be made in the case of courses taken through the United States Armed Forces Institute.

Not more than twelve semester hours of credit taken in correspondence work may be applied toward the requirements for a degree. No more than 34 semester hours of approved extension class and correspondence study credit may be applied toward a Bachelor's degree.

## REQUIREMENT IN GOVERNMENT AND HISTORY

In order to meet the legal requirements for a baccalaureate degree, all students must have credit for six semester hours of American history or three semester hours of American history and three semester hours of Texas history, in addition to the long-standing government requirement of Government 206 and credit for three semester hours of military or air science. For those students who do not take military or air science, six hours of government must be completed. Such students must complete Government 206 and 207.

In satisfying the government requirement for a teacher's certificate, Government 206 and 207 may be used. Government 205 will fulfill this requirement. Credit for basic military science cannot be used in satisfying this requirement.

## REQUIREMENT IN PHYSICAL EDUCATION

All students under 21 years of age at the time of entrance are required to complete Physical Education 101, 102, 201, 202.

Transfer students will be given exemption from one semester of required physical education for each semester of course work completed at the other institution.

Students who have completed as much as one year of service in the Armed Forces of the United States on active duty will be exempt from the requirement in physical education.

## REQUIREMENT IN MILITARY TRAINING

Any student entering with freshman classification (less than 30 semester hours of credit) who is a citizen of the United States, physically qualified, under 21 years of age, and who has had no previous service with the Armed Forces must successfully complete two years of military training.

Enrollment in air science, military science, or naval science is synonymous with enrollment in the Corps of Cadets and is a part of military training as offered at this college. The Corps is organized into military units which are constantly under military discipline and supervision; likewise, the members of the Corps are required at all times to wear the appropriate uniform.

Members of the Corps of Cadets, who are housed in military units, will, upon the completion of the basic course, make application for advanced course contract, and, if qualified, be enrolled in advanced course ROTC. Students are reminded that acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of the ROTC summer camp, and acceptance of a reserve commission if one is tendered. The foregoing become integral parts of the degree requirements of advanced course ROTC students. Therefore, for those students under an advanced course ROTC contract, the College will not grant a degree prior to acceptance of a reserve commission. Likewise, the reserve commission will be withheld from advanced course ROTC students who have completed requirements for a reserve commission until they have completed work for their academic degree.

Students in the Texas Maritime Academy should refer to the paragraphs headed "United States Navy and the Texas Maritime Academy" in the section of this catalogue devoted to the Texas Maritime Academy.

## ELIGIBILITY FOR AN ADVANCED ROTC CONTRACT

To be considered for an advanced course ROTC contract a student must: (1) be morally and physically qualified, (2) attain junior classification with a minimum grade point ratio of 1.00, (3) have satisfactorily completed the ROTC basic course or have served at least one year of active military service, (4) attain a passing score on the ROTC qualifying examination.

Where the number of contracts to be awarded is for any reason limited, those candidates with the highest qualifications will receive contracts for advanced training.

## ACADEMIC CREDIT IN MILITARY TRAINING FOR EX-SERVICEMEN

Students who have completed one year of service in the Armed Forces of the United States on active duty are exempt from further military training and may be given academic credit of four semester hours for basic ROTC.

Students who have completed six months (under RFA 1955) but less than one year of active duty in the Armed Forces of the United States will be given academic credit for the first year of Army ROTC, but will be required to live in the Corps of Cadets. Such students may be given academic credit for two semester hours of Army basic ROTC. (Credit for six months' training does not apply to the Air Force ROTC.)

Students who have served for at least one year in the Armed Forces of the United States on active duty and who hold a commission are exempt from further military training and may be given academic credit of sixteen semester hours for basic and advanced ROTC.

A student wishing to receive such credit should file a photostatic or certified copy of his discharge with the Registrar's Office so that appropriate credit may be allowed.

### ENGLISH CONFERENCES

Students enrolled in courses in English composition are required to attend conferences with their instructors.

### ASSEMBLIES

In most of the teaching divisions of the College, students are required to attend assemblies at intervals during the session. Prominent speakers are presented at the assemblies for the discussion of topics of general and special interest.

## THE GRADING SYSTEM

Since one comes to college for an education, his grades are usually taken as an indication of the proficiency of his endeavors. The student's semester grade in a course is based upon recitation, written exercises and tests, laboratory work, and the final examination. The final examination has a weight of one-fourth of the final grade, and the proportionate weight assigned to each of the other factors is determined by the head of the department administering the course.

There are four passing grades signifying various degrees of achievement, and grade points are awarded on the basis of these grades.

| Grade | Description | Range (Inclusive) | Grade Points per Semester Hour |
|---|---|---|---|
| A | Excellent | 92-100 | 3 |
| B | Good | 84- 91 | 2 |
| C | Fair | 76- 83 | 1 |
| D | Passing | 70- 75 | 0 |

The lowest passing grade is 70. There is one failing grade, F, below 70, indicating work of unsatisfactory quality. Credit for a course failed may be obtained only by satisfactorily repeating the course in class, except that in a course including both theory and practice, the head of a department may excuse a student from repeating the practice if his grade in the practice is B or better, and if in the judgment of the head of the department the repetition is not necessary. The student must register for both theory and practice, however.

The temporary grade "Inc." (Incomplete) indicates that the student has satisfactorily completed the course with the exception of a major quiz, final examination, or other work. This grade is given only when the deficiency is due to authorized absence or other cause beyond the control of the student and when the work already done has been of a quality acceptable for the satisfactory completion of the course. The privilege of completing such work is limited to the end of the first month of his succeeding semester in college; otherwise the student must repeat the course in order to receive credit, unless for good reason his dean grants an extension of time.

Permission to remove a semester grade of "Inc." received because of absence from a quiz or examination may be granted by the head of the department only on receipt of official notice that the absence was authorized or evidence that the cause for the absence prevented making normal preparation to take the quiz or examination before the close of the semester.

When a student resigns or is dropped from the College after the first two weeks of a semester, the Registrar calls for his grades and enters on his permanent record the symbol WP after each course in which he is passing and WF after each course in which he is not making a passing grade. All WF's and F's will be taken into account in determining his grade point ratio thereafter unless for cause the Executive Committee directs otherwise.

The semester grade in a subject which a student is required to drop on account of failure to keep up with the work is F.

## REPETITION OF A COURSE TO IMPROVE GRADE

Any student who wishes to repeat a course to improve his grade in that course must do so before he completes a more advanced course in the same subject-matter field.

## GRADE POINT RATIO

A student's grade point ratio for any period is computed by dividing the total number of semester hours for which he received grades into the total number of grade points earned in that period. Grades of WF and F are included, but grades of WP are excluded.

Only the record made in course work for which the student was registered in this institution is used in determining his grade point ratio.

## GRADE REPORTS

**Preliminary Report:** A preliminary report of the student's progress is sent to the parent or guardian about eight weeks after the beginning of each semester.

**Semester Reports:** At the close of each semester, a report of the student's work during the semester is sent directly to the parent or guardian.

**Unsatisfactory Work:** During the session the deans receive reports from the members of the teaching staff on students doing unsatisfactory work. These reports form the basis for personal conferences with the students concerned and for special notices to parents and guardians.

**Reports to High Schools:** At the close of the first semester, a report is sent to each accredited high school showing the grades made by the freshmen entering the College from that school.

## DISTINGUISHED STUDENTS

A student who completes a semester schedule of at least 15 hours with no grade lower than C and with a grade point ratio of not less than 2.25 for the semester shall be designated as a "Distinguished Student". In official acknowledgment of the designation, he is issued a Distinguished Student card by the dean of his school.

As a recognition of his scholastic achievement, the College allows a Distinguished Student to present his card to the instructor during the next succeeding semester after he distinguishes and, without requirement or privilege of making up the work missed, absent himself from any theory class except for announced quizzes provided, however, that any student who without permission of the instructor leaves a class to which he has reported shall be given a grade of zero for the day's work. This privilege may be revoked for cause at any time by the dean of the student's school.

## HONORARY SCHOLASTIC SOCIETIES

Students ranking near the top of their class scholastically will be considered for admission to one or more of the national honorary societies described below. The honor societies are intended to reward the student of character and ability, and membership in them is a well-recognized mark of distinction which becomes a part of one's permanent record.

**Alpha Kappa Delta.** This is the only national sociology honor society. Membership is by election and all graduate and undergraduate students with at least a "B" average in sociology, an over-all grade point average of 2.00, and at least 10 hours of sociology are eligible as candidates for this society.

**Alpha Pi Mu.** This fraternity is a national industrial engineering society. Eligibility for membership is limited to juniors in the upper fifth of the industrial engineering class, and to seniors in the upper third, together with demonstrated qualities of leadership, ethicality, sociability, and breadth of interest.

**Alpha Zeta.** This is the oldest national agricultural honor fraternity in the country. Election to membership is limited to junior and senior students in agriculture who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Chi Epsilon.** Civil engineering students may be elected by the present membership to this national honorary scholastic fraternity. It is open to junior and senior students who have a scholastic rank in the upper one-third of their class with an appropriate grade point ratio as defined in the membership requirements of the society.

**Eta Kappa Nu.** Electrical engineering majors are eligible for membership in this national honor society. It is open to junior students in the top one-fourth of their class and to senior students in the top one-third of their class.

**Iota Lambda Sigma.** This fraternity is a national society open to all industrial education majors. Students are required to have an over-all grade point average of 1.50, and of 2.00 in industrial education courses for membership. Its objectives are to encourage and develop scholarship, leadership, and a professional pride among industrial education students.

**Phi Eta Sigma.** Election to this freshman honor society is automatic upon attainment of a grade point ratio of 2.50 or better in all freshman work for one semester or more. The individual must have carried an academic load of at least 13 semester hours and must not have transferred more than 20 hours from another college.

**Phi Kappa Phi.** Open to all academic fields in the undergraduate school, this honor society elects its membership from those students who are within a year of graduation in a four-year course and are within the top one-tenth of their class scholastically. The student must have been registered one year in the College to be eligible. Graduate students with outstanding records who have satisfied the residence requirement are also eligible for membership.

**Phi Lambda Upsilon.** This is the oldest national chemical honor fraternity in the country. Election to membership is limited to junior, senior, and graduate students in chemistry and chemical engineering who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Phi Zeta.** Students in the School of Veterinary Medicine who rank in the upper ten per cent of the junior class or upper twenty-five per cent of the senior class and who have a grade point ratio of at least 2.25 in their entire veterinary curriculum through the preceding semester are eligible for election to this honor society.

**Sigma Gamma Tau.** Aerospace engineering students may be elected by the present membership to this national honorary scholastic fraternity. The minimum grade point ratio is 2.00 for eligibility for this society.

**Sigma Pi Sigma.** Students elected to membership in this national physics honor society must attain high standards of scholarship, outstanding achievement in physics, and promise of professional merit. A minimum grade point average of 2.00 and a grade of B or better in an advanced physics course is required for eligibility.

**Sigma Xi.** The object of this society is to encourage original investigation in science, pure and applied. It is open to graduate students and to staff members of the A. and M. College System who have shown a marked excellence in one or more departments of pure or applied science and given evidence of an aptitude for scientific research.

**Tau Beta Pi.** Students in the School of Engineering who rank in the top one-eighth of the junior class or top one-tenth of the senior class are eligible for election to this society. This is the oldest national engineering society founded for the purpose of recognizing scholarship.

## SCHOLASTIC PROBATION

Whenever a student's cumulative record indicates that he is failing to make satisfactory progress, he is considered as scholastically deficient. The cause of the deficiency will be investigated by the dean of his school, and the student may be placed on scholastic probation of such terms as the dean shall designate, or he may be required to withdraw from the College if the deficiency warrants.

Scholastic probation is a conditional permission for a student to continue in school after he has become scholastically deficient or after he has incurred an excessive number of unauthorized absences. This permission is granted by the dean of the student's school when an analysis of the deficiency indicates that a continuation is in the best interests of the student and the College.

## CLASSIFICATION

Sophomore, junior, and senior classification will be granted on completion of 30, 60, and 95 semester hours respectively.

## EXCESS HOURS

A student may register for the regular semester program in his curriculum if he is in good standing. With the dean's approval, necessary adjustments for minor irregularities may be authorized up to 20 hours. Registration for 21 hours or more may be approved under the following conditions:

| Hours | Grade Point Ratio Last Semester or Overall |
|---|---|
| 21 | 1.50 |
| 22 | 2.00 |
| 23 | 2.25 |
| 24 | 2.50 |

The normal amount of work a student may carry in a six-week summer term is 6 semester hours (or 7 if part is practice). Hours in excess of a normal load may be authorized in certain cases by the student's dean in conformance with the limitations that apply during the academic year. For the entire summer session the maximum number permissible is 15 semester hours.

# TRAINING FOR GOVERNMENT SERVICE

## Government Employment

The United States Government employs many college graduates trained in specialized fields of engineering, agriculture, and the natural and social sciences for assignment either at home or abroad. In some instances experience is a desirable or necessary qualification for federal employment. Within fixed limits graduate study is normally accepted as the equivalent of experience. Except for positions of high rank, employment is on the basis of competitive examinations. Information concerning these opportunities and Civil Service examinations to qualify for them is readily obtainable from any United States Post Office or from the Civil Service Commission, Washington 25, D.C.

Students interested in governmental service with local, state, national, or international agencies are advised to consider the courses listed in the areas of public administration, governmental organization and functions, economics, business, and sociology.

## Agricultural Foreign Service

Recently many specialists in agriculture have been appointed to administer technical programs of the United States in foreign countries. In addition to their own field of specialization, such technically trained candidates will often find some knowledge of foreign language (French, German, Portuguese, Russian, or Spanish) useful. They should likewise command a good knowledge of our own language, government and history, and economics. Students who are interested in such a program should at the earliest possible date confer with the Director of Agricultural Instruction and the head of the subject matter department of major interest in order to work out a satisfactory degree program.

## The Foreign Service of the United States

Superior students who plan to take the examinations for career officers in the Foreign Service of the United States are urged to consult the Head of the Department of History and Government or the Dean of Arts and Sciences. In general they should follow a broad program of study with emphasis on English, foreign languages, history and government, economics, mathematics and statistics, literature, geography, anthropology, and similar courses. Those primarily interested in Latin America might refer to the paragraph on Latin American studies in the School of Arts and Sciences for some specific suggestions. Besides the general examinations on the reading of English and on vocabulary, on statistics and mathematics, on general knowledge, and on written English, candidates take special examinations on world or United States history and government, economics, and modern languages.

# PREPARATION FOR TEACHING

Teacher education is an important part of the college curriculum, so much that it is a college-wide enterprise. The Council on Teacher Education, an administrative body, comprised of representatives from all departments engaged in teacher education, gives general direction to the institutional program. All of the teacher preparation programs are fully certified and meet the standards set forth by the State of Texas and the Texas Education Agency.

Students who decide on a career in teacher education will find the field offers many challenging opportunities for advancement. The good teacher should possess a keen desire to work understandingly with youths, their parents, and his professional associates.

A student may prepare for teaching by selecting a program in one of four departments of the College. These are the Department of Agricultural Education in the School of Agriculture; the Department of Education and Psychology and the Department of Health and Physical Education, both in the School of Arts and Sciences; and the Department of Industrial Education in the School of Engineering.

The student may choose teaching fields from among those listed below:

Agricultural Education
Biology
Business
Chemistry
Driver Education
English
General Science
Health and Physical Education
History
Industrial Arts Education
Industrial Vocational Education
Journalism
Mathematics
Physics
Spanish

An approved graduate program is available to those who wish to do additional work in either the Departments of Agricultural Education, Industrial Education, or Education and Psychology. A minor program is offered by the Department of Health and Physical Education. Professional programs are approved for certification of superintendents, principals, supervisors, counselors, visiting teachers, and master teachers within subject-matter areas.

The Placement Office of the College endeavors to assist graduates and students of the College in securing suitable teaching positions and to assist boards of education and other officials in securing teachers. The Placement Office makes every effort to place candidates who register for the service in good positions. Information obtained from professors and others is confidential. No charge is made for this service.

**Education and Psychology**

The Department of Education and Psychology coordinates the programs of teacher preparation in the academic areas commonly taught in the high school. Areas of specialization may be obtained in biology, business, chemistry, English, general science, history, journalism, mathematics, physics, and Spanish.

Students may choose to major in the Department of Education and Psychology or in the college department representing their subject-matter specialty. In either case the student must complete a 24-hour sequence in his teaching fields, or he must select a 48-hour approved program in the broad field of social studies or of natural sciences. In addition 18 hours of courses in education and psychology will be required for certification. Majors in the department itself will take 12 additional hours in professional development and will follow the four-year program outlined in the section of this catalogue devoted to the School of Arts and Sciences.

The Department offers a graduate program leading to the Master of Education or Master of Science degree. It prepares students for professional certification as master teachers or as superintendents, principals, supervisors, counselors, or visiting teachers. Certification at the professional level requires three years of teaching experience in addition to graduate level training.

### Health and Physical Education

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; or (3) athletic trainer. Students completing the prescribed curriculum will be eligible for the Provisional All Grade Level Certificate in Health and Physical Education and a Provisional Secondary Certificate.

### Agricultural Education

Training provided in Agricultural Education prepares the prospective teacher to operate a program of vocational agriculture as an integral part of the high school educational system. Agricultural education majors may also qualify for a second teaching field in biology. The curriculum in agricultural education provides a well-rounded education in areas involving teacher-student and teacher-community relationships, science, technical agriculture, and general education.

Courses involving teacher-student and teacher-community relationships offered in the agricultural education curriculum are educational psychology, secondary school curriculum, principles of agricultural education, course building for in-school youth, Future Farmer and Young Farmer activities, adult education, methods of developing supervised farming programs, student teaching in vocational agriculture, and agricultural journalism. These courses are designed to develop basic educational philosophies, methods of selecting problems to be taught, and methods of teaching in-school youth, young farmers, and adult farmers.

A minimum of 55 semester hours in technical agriculture is required for agricultural education graduates. This provides an opportunity for the graduate to have a knowledge of the technical agriculture that is essential for successfully teaching vocational agriculture.

General education receives emphasis in the agricultural education curriculum. This includes courses in English, history, government, mathematics, and economics. Thirty semester hours of science are included in the agricultural education curriculum. This training prepares the prospective high school teacher of vocational agriculture to operate an efficient educational program in agriculture. Since this educational program includes both high school students and adult farmers, the prospective teacher must be technically and professionally competent.

### Industrial Education

The Department of Industrial Education offers two options in teacher preparation leading to the Bachelor of Science degree in industrial education. Qualified students may pursue any of the courses of study described below with reasonable assurance of being able to secure a position in the field for which they have prepared. Master of Education, Master of Science, and Doctor of Education degrees are also available with majors in industrial education.

#### Industrial Arts Education

Graduates of this curriculum may become industrial arts teachers in the junior and senior high schools of the State. (Industrial arts in these schools includes general shop, electrical work, woodwork, technical drawing, plastics, ceramics, leather, and other craft courses.) The industrialization of the Southwest has created many outstanding opportunities for the prospective industrial arts teacher.

#### Vocational Industrial Education

The vocational industrial teacher education option in the industrial education curriculum is intended for teachers, supervisors, and directors for the vocational industrial schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, a candidate for a degree must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan. The Head of the Department of Industrial Education will assist the student in the preparation of his degree plan.

# COUNSELING AND GUIDANCE SERVICE

## Purposes

The Counseling and Testing Center provides testing, counseling, and guidance services to students and related consultative services to the faculty and staff.

## Counseling

At the Center a student will find professionally qualified counselors with whom he can discuss in confidence problems of a personal, vocational or educational nature. A student may request help of the Counseling and Testing Center, or he may be referred by a proper representative of the college, a parent, or other interested persons.

Counselors help the student better understand himself in order that his decisions—educational, personal, and vocational—will reflect maturity of judgment and a realistic appraisal of his abilities, interests, and aptitudes.

## Guidance

The group guidance program assists college students with problems which are common to most students—such as the choice of a course of study, how to study in college, improvement of college reading abilities, and a survey of fields of knowledge. A student may enroll voluntarily in any group guidance course of his choice, or he may be recommended for such a course by an advisor or counselor. These courses each carry one hour of college credit and may be used as electives in degree programs.

**Basic 102. College Reading:** This laboratory course is designed to develop in students maximal proficiency in reading college level materials. Rate of reading, comprehension, and vocabulary are improved through programmed exercises and use of teaching machines. Skills important in surveying, skimming, scanning, reviewing, and studying written material are developed. Students with advanced standing may emphasize research, scientific, or analytic reading skills.

**Basic 103. College Study:** This course is designed to help students to develop more effective study skills, time schedules, note-taking, examination skills, and basic textbook study methods. The course is not a tutoring course, but it will emphasize methods of efficient study.

**Basic 105. The World of Work:** This is a course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas are studied intensively, and each student is given an opportunity to study his aptitudes and interests, and to relate them to various vocational requirements.

Basic 105 is a required course for General Curriculum students, those students who are interested in attending A. and M. but have not decided upon a major field of study. In cooperation with the Dean of the School of Arts and Sciences, who administers the General Curriculum program, a counselor from the Counseling and Testing Center helps the student plan his program at some time prior to his registration for the first semester.

**Basic 106. Survey of Man's Knowledge:** This is a course recommended for the student who has his vocational goal more clearly in mind. The course acquaints the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature are investigated.

## Vocational Reading Room

For the use of students in the General Curriculum program and other students who are investigating vocations, a Vocational Reading Room is provided. Here up to date and objective information is maintained about most vocational fields. In addition, the student can be referred to professors on the campus who train students in the different professions and vocations.

**Remedial Services**

Individual assistance is available for those with special difficulties in spelling, handwriting, functional vision and hearing, written expression, and problems in taking examinations. The Center also offers help to those students with minor speech disorders which do not require extensive treatment.

**Testing Service**

The A. and M. College of Texas requires as a part of its admission procedure for all students seeking admission for their first semester of college work the College Entrance Examination Board (CEEB) tests. Results of these tests are to be used for counseling and placement purposes. The following tests will be required:

Scholastic Aptitude Test (SAT)
English Composition Achievement Test
Mathematics Achievement Test (Intermediate or Advanced)

Testing dates, locations, and fees required are described in an information bulletin which may be obtained by writing to the College Entrance Examination Board, Box 592, Princeton, New Jersey.

During the summer months a number of two-day counseling and testing clinics are offered on the campus. These clinics will offer the student the opportunity to take additional tests and have a group interpretation made. Also in a conference with his academic dean or faculty advisor his own scores will be interpreted to him and his program planned for his first semester. Many other valuable experiences will be offered to the students in these two-day clinics. Parents are urged to accompany the students and opportunity will be provided for them to participate in certain of these activities. Further information regarding the clinics can be obtained by contacting the Director of the Counseling and Testing Center.

**The A. and M. Adjunct**

The A. and M. Adjunct is a summer school with a camp atmosphere for students entering college for the first time. The college has developed a beautiful campsite of 411 acres on the South Llano River in the heart of the Texas Hill Country, about one mile from Junction, Texas. Two six weeks terms are offered each summer.

A well rounded program for each student includes classwork, study, and recreation. The student takes seven hours of regular college work, usually college English, college math, and physical education. Teachers and counselors are available to help the student with problems that may arise.

At the first of each term every student is given a comprehensive group of tests. This group consists of aptitude, achievement and interest tests which aid the counselor in helping the student decide upon his course of study for the summer term and his future course of study to follow in college.

An organized inter-cabin competitive intramural program is offered. Also, swimming, canoeing, and fishing activities are conducted in the cool, clear water of the South Llano River. An outdoor amphitheater is available for variety shows, motion pictures, and group meetings.

The A. and M. Adjunct is administered by the Counseling and Testing Center through the Dean of Instruction. In almost every case staff members come from the regular faculty of the A. and M. College. The Center works closely with the departments who offer courses in the instructional program. Students interested in this program should write or contact the Director of Admissions.

**General Curriculum:** The general curriculum is designed to meet the needs of the new student who has not decided upon a major field of study. It is arranged to assist the student in evaluating himself and in evaluating the several possible degree objectives, and at the same time to afford general courses that have application in almost all curricula. A student who decides upon his major field of interest by the beginning of the second semester may declare his degree objective and register for the courses outlined in that curriculum. If a student has not decided upon his degree objective by this time, he is advised to continue with the General Curriculum for the second semester.

## GENERAL CURRICULUM

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Basic 105**<br>The World of Work | (0-2) | 1 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics** | | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Elective** | | 10 |
| **Elective** | | 7 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 18 |
| | | 18 | | | |

Assignment to the specific courses listed above will be made in conference with a member of the faculty and in accord with the student's achievement. The courses designated as mathematics and elective will be assigned in line with the requirements of the curriculum in which the student expresses greatest interest. General Curriculum students are under the academic supervision of the Dean of the School of Arts and Sciences.

As a part of the elective hours, a student may take either Biology 101, 107, 108, or Chemistry 101, 102 in the first and second semesters. Chemistry is required or is acceptable in more curricula than biology. A student evidencing a deficiency in mathematics may be required to delay chemistry a semester.

A student whose high school record and entrance tests indicate inadequate preparation may be required to register for either a reduced load or special courses designed to meet his need.

# THE SCHOOL OF AGRICULTURE

The various curricula in the School of Agriculture have as their main objectives the preparation of young men for farming, ranching, and other businesses associated with agriculture; for harvesting, processing, and marketing of food and fiber products; for the pursuit of scientific investigation in the broad field of agriculture, including soils, water and plant and animal products, both native and cultivated; for careers in teaching or extension work in agriculture; for work with various governmental and private agricultural agencies; or for the teaching of conservation and management of our natural and cultivated resources. Systematic training is given in the sciences of chemistry, physics, mathematics, and biology, all of which are fundamental to the study of scientific agriculture. The curricula offered give the student a wide range of choice in the selection of a major, and elective courses provide excellent opportunity for enlarging his field of learning in keeping with his individual interest and needs.

## CURRICULA

- Agricultural Economics
  - Agricultural Administration Option
  - Farm Management Option
- Agricultural Education
- Agricultural Engineering
- Agricultural Journalism
- Agronomy
- Animal Husbandry
  - Commercial Option
  - Production Option
- Animal Science
- Dairy Science
  - Manufacturing Option
  - Production Option
- Entomology
- Floriculture
- Food Technology
- *Forestry
- Horticulture
- Plant and Soil Science
- Poultry Science
- Range Management
- Sociology
  - Human Relations Option
  - Rural Leadership Option
- Wildlife Management
  - Fisheries Option

*The present curriculum includes the first two years of forestry only.

## Curricula in
## AGRICULTURAL ECONOMICS

Trained personnel are needed in agricultural economics in the fields of marketing and price analysis, farm and ranch management, resource economics, agricultural policy, and finance and consumer economics.

### Agricultural Administration Option

The program in agricultural administration prepares students for employment with governmental and private agencies; in such positions as research workers, marketing specialists, agricultural agents of banks and business firms; as extension workers; and as salesmen and teachers. Electives in business administration prepare students for work in businesses related to agriculture. Electives in technical agriculture prepare a student who wishes to become a specialist in the marketing of a particular farm product.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | |
| **Or** | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | |
| **Or** | | |
| **Agricultural Economics 452**<br>International Trade and Agriculture | (3-0) | 3 |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 447**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Agricultural Economics 430**<br>Agricultural Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. AGRICULTURAL BUSINESS ADMINISTRATION: Students preparing for work with business concerns allied with agriculture should elect from 9 to 18 credit hours of work in business administration and economics.
2. AGRICULTURAL MARKETING: Students preparing for work in agricultural marketing should elect from 9 to 18 hours in courses dealing with the production, grading, and marketing of commodities.
3. AGRICULTURAL ECONOMICS: Students preparing for professional work in agricultural economics and expecting to take graduate training should elect courses in the various social sciences, including courses in advanced economic theory.
4. Not more than 6 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.

### Farm Management Option

The program in farm management prepares students for the operation of farms and ranches and for professional and commercial work dealing with agriculture. Electives in technical agriculture permit students to emphasize the study of particular agricultural enterprises.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | |
| **Or** | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records and Accounts | (2-2) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Elective** | | 1 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 432**<br>Farm and Ranch Appraisal and Organization | (2-2) | 3 |
| **Agricultural Economics 447**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Not more than 9 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.
2. Other electives shall be selected with view to strengthening the student's preparation for farm operation and closely related agencies and businesses.

## Curriculum in
## AGRICULTURAL EDUCATION

This curriculum, which includes well balanced selections in various areas of technical agriculture, is designed to give the teacher of vocational agriculture the preparation and training in both technical agriculture and professional education, including student teaching, required to qualify under the Texas Education Agency State Plan for Vocational Education. Students also qualify for the biology teaching certificate.

In addition to being qualified to teach vocational agriculture, graduates of this curriculum find employment with the agricultural extension service and the soil conservation service, in agricultural public relations work with banks and other agencies, with chambers of commerce and news gathering and reporting agencies, and with industries related to agriculture.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | |
| Or | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | |
| Or | | |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 221**<br>Farm Shop | (1-3) | 2 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | |
| Or | | |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Journalism 201[1]**<br>News Writing | (2-3) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | |
| Or | | |
| **Agricultural Engineering 325**<br>Farm Electricity | (2-2) | 3 |
| **Agricultural Engineering 222**<br>Farm Shop | (1-3) | 2 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective (Physical Science[2])** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Education 301**<br>Introduction to Agricultural Education | (1-2) | 2 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Elective (Animal Science[3])** | | 3 |
| **Elective (Plant Science[4])** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agronomy 318**<br>Soil Conservation | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective (Plant Science[5])** | | 3 |
| | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Education 425**<br>Course Building | (1-2) | 2 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 |
| **Journalism 415**[1]<br>Agricultural Journalism | (2-2) | 3 |
| **Elective**[6] | | 3 |
| **Elective** | | 1 |
| | | 15 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Education 427**<br>Methods of Developing Farm Programs | (1-2) | 2 |
| **Agricultural Education 436**[7]<br>Student Teaching in Agricultural Education | (2-12) | 6 |
| **Animal Husbandry 416**<br>Livestock Management | (1-2) | 2 |
| **Dairy Science 420**<br>Dairy Management | (1-2) | 2 |
| **Poultry Science 401**<br>Management and Selection | (1-2) | 2 |
| **Elective** | | 2 |
| | | 16 |

NOTES:
1. A course in English may be elected in place of this course.
2. The physical science elective is to be selected from Geography 203; Geology 205, 309; Mathematics 103, 104, 110; Physics 213.
3. This animal science elective is to be selected from: Animal Husbandry 306, 433; Entomology 301; Wildlife Management 401, 403.
4. This plant science elective is to be selected from: Agronomy 304; Biology 102, 327, 349, 353, 435; Plant Physiology and Pathology 313, 314; Range and Forestry 301, 303.
5. This plant science elective is to be selected from: Agronomy 306, 308, 417; Plant Physiology and Pathology 301; Range and Forestry 401, 412.
6. These electives are to be selected from: Agricultural Economics 321, 413, 429, 430, 452; Business Administration 211; Geography 204, 401; History 318; Sociology 404, 407.
7. The laboratory hours in Agricultural Education 436 will include six weeks of off-campus student teaching.

## Curriculum in
## AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is under the joint supervision of the School of Agriculture and the School of Engineering. Agricultural engineering deals with the application of the fundamental branches of engineering to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The term "agricultural engineer" denotes an engineer who has been trained in both engineering and agriculture, with experience in combining the two, and who is qualified to develop, design, organize, and direct engineering work in agriculture and closely allied industries.

In general, agricultural engineering may be broken down into five major phases of activity: power and machinery; agricultural structures design; farm electrification; agricultural process engineering; and soil and water control and conservation, which includes drainage, flood control, irrigation, and soil erosion control.

Graduates of this curriculum are prepared for service in teaching, extension, and research work; with government soil and water control projects; with manufacturers of farm equipment in advertising, sales, and design work; with engineering and contracting firms; with agricultural processing industries; and with building and equipment manufacturers.

Students who expect to enter the agricultural engineering curriculum and are not thoroughly grounded in the fundamentals of algebra and trigonometry are urged to attend a six-week term of summer school prior to the fall semester of the freshman year and take courses in algebra and trigonometry equivalent to Mathematics 102 and 103 at the A. and M. College of Texas. Those students who enter the fall semester's work not prepared to take Mathematics 121 should replace Mathematics 121 and History 105 in their fall schedule with Mathematics 102 and 103. Before the end of the fall semester, these students should contact the Head of the Department of Agricultural Engineering for specific instructions and a degree plan.

## For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 121**<br>Analytical Geometry and Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Agricultural Engineering 208**<br>Farm Machinery | (2-3) | 3 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 301**<br>Agricultural Structures Design | (2-3) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 16 |

| | | |
|---|---|---|
| **Agricultural Engineering 324**<br>Agricultural Engine and Tractor Design | (2-3) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Agricultural Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

## For classes graduating in 1963-64 and 1964-65

### JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Agricultural Engineering 301**<br>Agricultural Structures Design | (2-3) | 3 | **Agricultural Engineering 324**<br>Agricultural Engine and Tractor Design | (2-3) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 | **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
|  |  | 18 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
|  |  |  |  |  | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 | **Agricultural Engineering 410**<br>Irrigation and Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water Conservation Engineering | (2-3) | 3 | **Agricultural Engineering 413**<br>Agricultural Structures Design | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 | **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 | **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** |  | 3 |  |  | 16 |
|  |  | 18 |  |  |  |

## Curriculum in AGRICULTURAL JOURNALISM

The curriculum in agricultural journalism is designed to prepare students for professional careers as agricultural writers and editors, including work on bulletins and magazines as well as on rural and metropolitan newspapers, and in radio-TV broadcasting.

The first two years are planned to give students the fundamental studies. The program gives students an adequate background for general journalistic work and affords them opportunities to prepare themselves as specialists in certain phases of agricultural writing.

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Hnsbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** |  | 1 |
|  |  | 17 | **Physical Education 102** | (0-2) | R |
|  |  |  |  |  | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Journalism 201**<br>News Writing | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Journalism 307**<br>News Editing | (2-3) | 3 |
| **Journalism (elective)** | | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Journalism 311**<br>Radio and Television News Writing | (2-2) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Elective** | | 7 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Journalism 410**<br>Publications Production<br>and Graphic Arts | (2-3) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

NOTE: Electives shall be selected and substitutions made with the advice of the Head of the Department. Electives shall include at least 10 hours of advanced courses in agriculture.

## Curriculum in
## AGRONOMY

The program in agronomy prepares students for work in the broad fields of soil management and crop production. Agronomic training gives the student a thorough understanding of the basic sciences and, in addition, teaches him how to apply this knowledge in the improvement of crops and soils. The first phase of training includes such subjects as mathematics, chemistry, botany, entomology, bacteriology, genetics, and plant physiology. Specialized courses in plant and soil science, which emphasize efficient crop production practices and the conservation and improvement of our soils, are provided in the last two years of the curriculum.

The agronomy graduate is well trained in those subjects dealing with crops and soils and is qualified for the numerous activities related to his field of training. Professional opportunities include those in farming, farm management, and land appraisal; in fertilizer manufacture and sales, seed companies, grain marketing and milling, and agricultural equipment and supply businesses; in extension and education as county agents, extension specialists, college instructors, agricultural public relation specialists and agricultural editors and directors; and in technical fields with the Agricultural Experiment Stations, United States Department of Agriculture and Soil Conservation Service.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Liberal Arts 311**<br>Use of Library Resources | (0-2) | 1 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products<br>Or | (3-0) | |
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agronomy 306**<br>Grain and Fiber Crops | (3-2) | 4 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 10 |
| | | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curricula in
## ANIMAL HUSBANDRY

The Department of Animal Husbandry offers training for the future producers, processors, extension personnel, and scientists of the livestock industry.

The Animal Industries Building houses the offices, classrooms, meats laboratory, library, and some of the research facilities of the Department. The Department farm of 1,280 acres is adjacent to the campus and maintains purebred herds of cattle, swine, sheep, and horses for use in teaching, research, and extension. Additional grade and crossbred cattle are located at the College plantation a short distance from the campus. Modern barns and equipment are utilized in teaching the latest methods of production and marketing. A complete meats laboratory is equipped to slaughter, process, and preserve all classes of livestock. Student help in the department is utilized to the fullest extent to provide students with financial assistance as well as valuable experience in handling livestock.

Through the proper choice of elective courses, students may form a foundation for graduate study in either curriculum option. However, the interdepartmental animal science curriculum is planned especially for students preparing for graduate study.

### Commercial Option*

The commercial option is designed to meet the needs of future meat plant operators, feed industry personnel, livestock market personnel, pharmaceutical representatives, and related agricultural interests. Courses are offered in accounting, personnel management, business law, and psychology, in addition to the basic animal husbandry courses. Elective courses are selected with the aid of the departmental advisor.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 307**<br>Meats | (2-3) | 3 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | |
| Or | | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Veterinary Anatomy 202**<br>Veterinary Anatomy | (1-6) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

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*Students are required to take at least one animal husbandry production course: Animal Husbandry 406, 412, or 414.

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 | **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** |  | 5 | **Elective** |  | 5 |
|  |  | 18 |  |  | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Animal Husbandry 437**<br>Marketing and Grading of Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry (elective)** |  | 3 | **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Elective** |  | 9 |
| **Elective** |  | 3 |  |  |  |
|  |  | 18 |  |  | 18 |

## Production Option*

The production option is designed to meet the needs of future ranch managers, breed association fieldmen, county agents, livestock buyers, farm and ranch reporters, and related agricultural groups. The student will take courses in agronomy, range and forestry, animal breeding, and veterinary medicine as well as courses in animal husbandry. Elective courses are selected by the student with the aid of the departmental advisor.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 | **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
|  |  | 17 |  |  | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Animal Husbandry 307**<br>Meats | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **English 203**<br>Introduction to Literature<br>Or | (2-0) |  |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Veterinary Anatomy 202**<br>Veterinary Anatomy | (1-6) | 3 |
|  |  | 17 | **Elective** |  | 3 |
|  |  |  | **Physical Education 202** | (0-2) | R |
|  |  |  |  |  | 19 |

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*Students are required to take at least one animal husbandry production course: Animal Husbandry 406, 412, or 414.

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records<br>and Accounts | (2-2) | |
| **Or** | | 3 or 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 |
| **Elective** | | 3 or 2 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 306**<br>Animal Breeding | (2-2) | 3 |
| **Animal Husbandry 309**<br>Feeds and Feeding | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering (elective)** | | 3 |
| **Agronomy 308**<br>Forage Crops | (2-2) | |
| **Or** | | |
| **Range and Forestry 401**<br>Range Improvement<br>and Maintenance | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 437**<br>Marketing and Grading of<br>Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Veterinary Parasitology 487**<br>Parasites of Farm Animals<br>and Poultry | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## Curriculum in
## ANIMAL SCIENCE

Those who complete the curriculum in animal science will be qualified for graduate work in the fields of nutrition, animal breeding, genetics, physiology of reproduction, zoology, bio-statistics, and related fields. At the same time they are qualified for many of the positions available to graduates with a major in one of the animal curricula in the School of Agriculture.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**[1]<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective**[2] | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 217**<br>Comparative Anatomy<br>of Vertebrates | (2-4) | |
| **Or** | | |
| **Biology 343**<br>Histology | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professsional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biochemistry and Nutrition 410**[3]<br>Introductory Biochemistry | (3-3) | 4 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 9 |
| | | 17 |

NOTES:
1. Dairy Science 202 or Poultry Science 201 may be substituted.
2. Entomology 201 or 208 or Chemistry 226 is recommended.
3. Animal Husbandry 303 plus 1 hour of elective, or Poultry Science 411, may be substituted.
4. The student planning further study in animal husbandry, biochemistry and nutrition, dairy science, genetics, or poultry science should select suitable elective courses with the advice of the head of the appropriate department.

## Curricula in
## DAIRY SCIENCE

Trained personnel are much in demand to aid, service, manage, and direct the production, manufacture, and distribution of milk and dairy foods.

### Dairy Manufacturing Option

This major is designed to prepare students for careers in dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; merchandising and sales. Fundamental technical and business courses offer a well rounded program of training in these areas.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**[1]<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**[1]<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Dairy Science 307**<br>Judging Dairy Products | (0-2) | 1 |
| **Dairy Science 311**<br>Technical Control of Dairy Products | (2-6) | 4 |
| **Dairy Science 316**<br>Butter and Cheese Manufacture | (3-4) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Dairy Science 410**<br>Dairy Plant Management | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Dairy Science 407**<br>Ice Cream Manufacturing | (2-3) | 3 |
| **Dairy Science 415**<br>Condensed and Powdered Milk | (2-2) | 3 |
| **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

NOTES:

1. Students who expect to major in dairy manufacturing may substitute Mathematics 103 or 110 for Poultry Science 201 or Entomology 201.
2. Electives shall be selected and substitutions made with the advice of the Head of the Department.
3. At least 16 but not more than 26 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

### Dairy Production Option

This major is designed for students interested in careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding, or management; as extension dairy specialists and organization leaders and as workers in allied fields.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**[1]<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Dairy Science 303**<br>Dairy Cattle Judging | (0-3) | 1 | **Agronomy 308**<br>Forage Crops | (2-2) | 3 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 | **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Animal Husbandry 306**<br>Animal Breeding | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 2 | **Elective** | | 3 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Dairy Science 324**<br>Commercial Dairy Products | (3-0) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 | **Dairy Science 418**<br>Feeding and Management of Dairy Cattle | (3-2) | 4 |
| **Dairy Science 417**<br>History and Development of Dairy Cattle | (2-2) | 3 | **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | | **History 326**<br>History of Texas | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | **Elective** | | 7 |
| **History 325**<br>Trends in American History | (3-0) | 3 | | | 18 |
| **Elective** | | 3 | | | |
| | | 18 | | | |

NOTES: 1. Students who expect to major in dairy production may substitute Mathematics 103 or 110 for Poultry Science 201.

2. Electives shall be selected and substitutions made with the advice of the Head of the Department.

3. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## ENTOMOLOGY

The program in entomology is intended to prepare students for careers in either research, extension, teaching, business, or industry. The curriculum includes basic studies in insect taxonomy, morphology, physiology, toxicology, and economic entomology. It also includes fundamental subject matter in the various fields of agriculture as well as in the biological sciences.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## FLORICULTURE

Floriculture is that branch of agriculture concerned with the production, distribution, marketing, and landscape use of ornamental plants and plant products.

The program in floriculture includes sound preparation in such sciences as botany, soils, entomology, and genetics to enable a graduate to breed, propagate, and distribute improved varieties of ornamental plants, and to arrange and maintain them properly in landscape developments.

Floriculture is a business as well as a science, and the curriculum is designed to provide preparation for the highly technical and specialized growing operations of florist or nursery crop production, as well as specialized training for the activities concerned with landscape horticulture and for positions in associated industries requiring salespeople, floral designers, managers, executives, and experts in the packing, shipping, and storage operations connected with flower crops and nursery stock. Opportunities for employment also exist in the fields of teaching, research, and extension.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 16 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Floriculture 327**<br>Principles of Floriculture | (2-2) | 3 |
| **Floriculture 319**<br>Exotic Plants | (2-2) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Elective** | | 12 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 | | | 18 |
| **Elective** | | 5 | | | |
| | | 18 | | | |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Floriculture 425**<br>Landscape Maintenance and Construction | (3-3) | 4 |
| **Floriculture 424**<br>Propagation of Ornamental Plants | (2-2) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Elective** | | 11 |
| **Elective** | | 10 | | | |
| | | 18 | | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Landscape Horticulture: Students preparing for a career in landscape horticulture should elect from 9 to 18 credit hours in landscape architecture.
2. Floriculture: Students preparing for careers in commercial floriculture and nursery management should elect 9 to 18 hours in plant, soil, and crop sciences.
3. Plant Science: Students preparing for professional work in floriculture and landscape horticulture and expecting to take graduate work should elect courses in the various plant sciences, chemistry, and entomology.

## Curriculum in
## FOOD TECHNOLOGY

The curriculum in food technology is designed to train students in the technical and scientific problems of food processing and manufacturing. This course of study includes a number of elective hours, enabling the student to take major work in production, processing, inspection, and grading of dairy products, fruit and vegetable products, and miscellaneous foods and beverages. Students majoring in this curriculum are under the supervision of a committee on food technology, appointed from the agricultural teaching staff by the Dean of Agriculture.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Elective** | | 5 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 19 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Dairy Science 326**<br>Food Bacteriology | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 7 | **History 326**<br>History of Texas | (3-0) | 3 |
| | | 19 | **Elective** | | 3 |
| | | | | | 19 |

NOTE: Students enrolled in food technology will select an option in meat, dairy, horticulture, or poultry products and, with the counsel of a member of the Food Technology Committee, will prepare a plan of study for his approval.

## Two-Year Curriculum in FORESTRY

The two-year curriculum in forestry provides the student with fundamental courses necessary for him to enter a Southern accredited school of forestry with junior standing. In addition to the arts and sciences, the curriculum includes the basic courses of plane surveying, agronomy, ecology, and forestry. The curriculum provides the fundamentals for study in the propagation, protection, and management of commercial timbers, the processing and manufacture of wood products, and the conservation of all products derived from forests. All accredited Southern forestry schools have approved the curriculum as adequate to permit the student to obtain his Bachelor of Science degree in Forestry upon the completion of two additional years of study. The Texas Legislature has provided funds which are available to defray certain out-of-state expenses for Texas students who attend accredited Southern forestry schools for the junior and senior years.

During the junior and senior years, the forestry student has the opportunity to specialize in forest production, forest utilization, wood technology, pulp and paper technology, wood products merchandising, or extension and public relations forestry.

A degree from an accredited school of forestry prepares the graduate for work in the fields of forest administration, management, research, and education.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 | **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | |
| | | 18 | | | 18 |

NOTE: Students who complete this two-year curriculum may continue their work for a degree in forestry in any accredited Southern forestry school. Funds have been appropriated by the Texas Legislature to help defray certain out-of-state expenses for Texas students attending such schools for their junior and senior years.

## Curriculum in
## HORTICULTURE

This program includes fundamental courses and specialized training in fruit growing, vegetable growing, plant propagation, and the processing of horticultural crops. Graduates are prepared for work as operators and owners of fruit orchards, vegetable farms, nurseries, and commercial processing plants. The training is also valuable for careers in teaching, extension, and research work in horticulture and related fields.

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Horticulture 311**<br>Processing Horticultural Crops | (2-3) | 3 |
| **Horticulture 322**<br>Vegetable Crops Management | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 2 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| **Or** | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Horticulture 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Entomology 405**<br>Horticultural Pests | (2-2) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

NOTES:
1. Electives shall be selected and substitutions made with the advice of the Head of the Department.
2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## PLANT AND SOIL SCIENCE

The curriculum in plant and soil science is designed to give students a technical background for the fields of plant breeding, plant pathology, plant physiology, turf management, soil fertility, soil physics and mineralogy. At the same time students are qualified for many other positions available to graduates with a major in one of the other plant curricula in the School of Agriculture.

The curriculum emphasizes the sciences of botany and chemistry but also gives a firm foundation in English and other liberal arts, and in agricultural courses.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Elective** | | 12 |
| | | 18 |

NOTE: Students must select all electives with the advice of the Head of the Department in which they expect to take their major work.

## Curriculum in
## POULTRY SCIENCE

The growth of the poultry industry and the need for a rapid expansion of scientific and technical knowledge in the various fields of science basic to successful poultry production have supplied the motivation for the development of courses in this phase of agriculture. In no field of agriculture is an understanding of the science and practice of feeding, breeding, physiology, pathology, heating, ventilation, processing, and marketing more necessary or more rewarded than in the modern intensive methods of producing poultry meat and eggs. Undergraduate students are trained to operate commercial poultry farms, hatcheries, feed mills, and poultry processing plants. They also find employment with such allied industries as feed manufacturers, equipment distributors, and manufacturers of vaccines and biologics, with poultry publications, and with the Extension Service. Many graduates in poultry science choose to take graduate work in this and allied fields.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Poultry Science 411**<br>Poultry Feeding | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Poultry Science 303**<br>Turkey Production | (2-0) | 2 |
| **Poultry Science 308**<br>Hatchery Management | (2-3) | 3 |
| **Veterinary Microbiology 334**<br>Poultry Diseases | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Poultry Science 309**<br>Broiler Production | (2-2) | 3 |
| **Poultry Science 407**<br>Technology and Marketing of Poultry and Poultry Products | (2-2) | 3 |
| **Poultry Science 414**<br>Poultry Breeding | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Poultry Science 481**<br>Poultry Seminar | (1-0) | 1 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTES:
1. Electives shall be selected and substitutions made with the advice of the Head of the Department.
2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in RANGE MANAGEMENT

This curriculum is designed to give students a thorough understanding of the great variety of problems met in the multiple use and conservation of noncultivated grazing lands. The first phase of training includes work in the physical, biological, and social sciences. Specialized courses in range management, range ecology, agrostology, forestry and conservation of natural resources are included in the last two years.

Graduates are prepared to enter the ranch business as owners or managers, for work as county agricultural agents, for work with Experiment Stations, and as college teachers in this field. A Bachelor's degree in range management gives the student the background for study toward advanced degrees. Men meeting Civil Service requirements are eligible for appointment with several United States Government agencies.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 309**<br>Agricultural Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Range and Forestry 303**<br>Agrostology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 308**<br>Forest Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Animal Husbandry 406**<br>Beef Cattle Production | (2-2) | | **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Or** | | 3 or 4 | **Agronomy 310**<br>Soil Morphology | (1-3) | 2 |
| **Animal Husbandry 414**<br>Sheep, Goats, and Fiber Technology | (3-2) | | **English 301**<br>Writing for Professional Men | (3-0) | |
| **Range and Forestry 304**<br>Range Management | (2-3) | 3 | **Or** | | |
| **Range and Forestry 309**<br>Silvics and Silviculture | (2-3) | 3 | **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 | **Range and Forestry 409**<br>Advanced Range Management | (2-3) | 3 |
| **Elective** | | 6 or 5 | **Elective** | | 7 |
| | | 18 | | | 18 |

## Curricula in SOCIOLOGY

Trained personnel are needed in sociology in the fields of population analysis, anthropology, social psychology, community development and social work.

### Human Relations Option

The program affords professional training in human relations with special emphasis on social problems, community development, social anthropology, social work, criminology and juvenile delinquency, population, institutions, and group organization. Graduates are qualified for employment as case workers, Chamber of Commerce directors, probation or parole officers, and Boy Scout executives.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Geography 201**<br>World Regional Geography | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Psychology 207**<br>General Psychology | (3-0) | | **Military or Air Science** | (0-3) | 1 |
| **Or** | | | **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 | **Elective** | | 5 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Physical Education 202** | (0-2) | R |
| **Elective** | | 6 | | | 18 |
| **Physical Education 201** | (0-2) | R | | | |
| | | 18 | | | |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Education 423**<br>Principles and Practices of Teaching | (3-0) | |
| **Or** | | |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Sociology 306**<br>Principles of Social Work | (3-0) | |
| **Or** | | |
| **Sociology 314**<br>Social Problems | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Journalism 406**<br>Publicity and Public Relations | (3-0) | 3 |
| **Sociology 320**<br>Social Anthropology | (3-0) | 3 |
| **Sociology 412**<br>Population Analysis | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Sociology 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Sociology 430**<br>Sociological Theory | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### Rural Leadership Option

This program affords professional training in rural sociology. Training is given in both the human side and the technical side of agriculture for students preparing to become county agricultural agents, participants in foreign agricultural programs, rural ministers, agricultural missionaries, and leaders in rural development programs.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Dairy Science 202**<br>Dairying | (2-2) | |
| **Or** | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Range and Forestry 401**<br>Range Improvement and Maintenance | (2-3) | 3 |
| **Sociology 320**<br>Social Anthropology | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | |
| **Or** | | |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Sociology 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 315**<br>The Family | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

## Curriculum in
## WILDLIFE MANAGEMENT

This curriculum includes work in all phases of fisheries and wildlife. At the beginning of the sophomore year, the student should elect one of the two options, fisheries or wildlife, because of difference in the basic sciences required. The junior and senior years are largely years of specialization.

This curriculum is designed (1) to train young men in the art of managing wildlife and fisheries, and of maintaining populations at levels consistent with good land-use practices and the desirability of the species involved; (2) to train men for research in taxonomy, distribution, and ecology of fishes, reptiles, amphibians, birds, and mammals; and (3) to train men for teaching at the high school and university levels. Opportunities are provided also, in cooperation with the Departments of Journalism and of Education, for training in the field of wildlife journalism and conservation education. For students planning on careers in research and/or teaching at the college level, an advanced degree will be required.

Upon completion of the wildlife management curriculum, graduates are prepared to enter occupations in the fisheries and/or wildlife fields, including management, research, teaching, and public relations. Men meeting Civil Service requirements are eligible for appointments with the United States Fish and Wildlife Service and other federal agencies. Also, graduates are eligible for employment by the various state game and fish commissions. A few positions are open from time to time as wildlife managers on private ranches and as writers of articles on outdoor life.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Elective** | | 6 |
| | | 19 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Elective** | | 6 |
| | | 19 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 408**<br>Techniques of Wildlife Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## Fisheries Option

### FRESHMAN YEAR

(Same as for Wildlife Management, page 142.)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Wildlife Management 312**<br>Ichthyology (Marine) | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Wildlife Management 417**<br>Biology of Fishes | (2-2) | 3 |
| **Elective** | | 7 |
| | | 17 |

| | | |
|---|---|---|
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Wildlife Management 410**<br>Conservation and Management of Fishes | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTES:

1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

3. Majors in the wildlife management option must participate in the summer field course, Wildlife Management 300, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

4. Majors in the fisheries option must participate in the summer field course, Wildlife Management 400, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

# THE SCHOOL OF ARTS AND SCIENCES

## CURRICULA

### DIVISION OF BUSINESS ADMINISTRATION

- Accounting
- Finance
- Management
- Marketing

### LIBERAL ARTS

- Economics
- English (Language and Literature)
- History
- Government
- Journalism
- Mathematics
- Modern Languages
- Pre-Law

### PSYCHOLOGY AND PREPARATION FOR TEACHING

- Psychology
- Education
- Physical Education

### SCIENCE

- Botany
- Chemistry
- Entomology
- Meteorology
- Microbiology
- Physics
- Premedical and Predental Program
- Zoology

### COMBINED DEGREE PLAN

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees. The student contemplating such a program should have a two-year grade point ratio above the normal minimum requirements and should consult with the heads of both departments and the deans concerned prior to formulating a combined degree plan.

### REQUIREMENT OF PROFICIENCY IN WRITTEN ENGLISH

In order to qualify for candidacy for a degree in the School of Arts and Sciences, all students majoring in departments of this school (Division of Business Administration; Departments of Biology, Chemistry, Economics, Education and Psychology, English, Health and Physical Education, History and Government, Journalism, Mathematics, Modern Languages, Oceanography and Meteorology, and Physics) must first demonstrate their ability to express themselves in acceptable English by passing a written examination in English composition. This examination must be taken not later than the spring semester of the junior year. Each student who fails to make a passing grade on a qualifying examination will be required to report to the Department of English for assignment for remedial work, which the student must complete satisfactorily without degree credit. Only if the Department of English has certified satisfactory completion of such remedial work and the student has passed his examination will the student be granted regular status as a candidate for a degree.

### ELECTIVES

In all curricula, elective hours are shown distributed over several semesters (one, two, or more a semester). The student is not expected to schedule his elective courses only in the units listed. He is free to schedule electives in whatever units he chooses up to and beyond the total number of elective hours in his curriculum. A student will normally be expected to take electives in accordance with his academic classification.

It is recommended that most of the elective courses be in fields other than the major, and that the student take at least one course outside his major field during each semester of his junior and senior years. For example, where possible a student in one of the curricula in business administration should choose electives outside the Division of Business Administration; the major in science should elect courses in the humanities and social sciences; and students in economics or history should elect courses in the natural sciences, in the humanities, and in business administration.

## LATIN AMERICAN STUDIES

A number of departments offer courses relating to Latin America, so that it is possible for many students (including some who are registered in the other schools of the College) to combine some concentration in Latin American studies with their regular department major. The program of offerings on Latin America is designed to meet the needs of four classes of students: (1) those who expect to enter into business in Latin America or into trade with Latin America; (2) those who contemplate a career in the foreign service of the United States Government or in any of the several government agencies in Washington which employ specialists on Latin America, with assignments both in the United States and in the foreign field; (3) those who expect to enter into teaching or research with emphasis upon Latin America; and (4) those who wish to broaden their education and acquire a better understanding of the people and the problems of Latin America. Any student who elects to coordinate some study of Latin America with a regular major in one of the College departments should consult the head of his major department for guidance in working out his program of study.

Those courses which bear directly on Latin America include the following:

| | | |
|---|---|---|
| **Geography 201**<br>World Regional Geography | (3-0) | 3 |
| **Geography 303**<br>Geography of South America | (3-0) | 3 |
| **Government 335**<br>Government and Politics of Latin America | (3-0) | 3 |
| **History 341**<br>South America to 1825 | (3-0) | 3 |
| **History 342**<br>South America Since Independence | (3-0) | 3 |
| **History 413**<br>Mexico and Spanish North America, 1492 to 1821 | (3-0) | 3 |
| **History 414**<br>History of Mexico, 1821 to the Present | (3-0) | 3 |
| **History 422**<br>International Rivalry in the Gulf-Caribbean Area, 1840 to the Present | (3-0) | 3 |
| **Modern Language 305**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 306**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 325**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 326**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 335**<br>Spanish-American Novel | (3-0) | 3 |
| **Modern Language 336**<br>Spanish-American Novel | (3-0) | 3 |

## DIVISION OF BUSINESS ADMINISTRATION

The several curricula in business administration provide training for business careers. The freshman and sophomore years are the same in all curricula. The student elects a major field at the beginning of the junior year choosing one of the following: accounting, finance, management, marketing.

Each curriculum contains courses essential to a general education and permits the study of fundamental business theory and procedure with limited specialization in one of the major fields. No more than twelve hours of elective courses in business administration will be counted toward a degree. Upon the completion of his chosen curriculum, the student will receive the degree of Bachelor of Business Administration.

Effective with this catalogue, the majors of building products marketing, insurance, personnel administration, and general business will be discontinued. However, students currently enrolled in these programs will complete their course requirements by following in general those curricula as outlined in catalogue 85.

## Curricula in
## ACCOUNTING, FINANCE, MANAGEMENT AND MARKETING

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **Business Administration 106**<br>Business Organization | (3-0) | 3 |
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Science*** | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 | **Business Administration 212**<br>Business Law | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## Curriculum in
## ACCOUNTING

The curriculum in accounting offers a professional course of training for employment in commercial and industrial accounting, public accounting, or governmental accounting. Positions in these fields are generally designated as accountant, public accountant, certified public accountant, tax accountant, auditor, cost accountant, internal auditor, and controller. The basic business training obtained in this curriculum also qualifies graduates for employment eventually leading to executive positions in industry.

### FRESHMAN AND SOPHOMORE YEARS

(See above)

### JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 | **Business Administration 328**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 329**<br>Elementary Cost Accounting | (3-0) | 3 | **Business Administration 332**<br>Cost Accounting | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Elective** | | 9 |
| **Elective** | | 4 | | | |
| | | 17 | | | 18 |

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*Students may elect one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 330**<br>Advanced Accounting | (3-0) | 3 | **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 341**<br>Corporation Finance | (3-0) | 3 | **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Business Administration 407**<br>Auditing | (3-0) | 3 | **Elective** | | 11 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | | | 17 |
| **Elective** | | 6 | | | |
| | | 17 | | | |

## Curriculum in FINANCE

The curriculum in finance provides instruction in the principles, methods, instruments, and institutions of finance with specialized training in the techniques and practices of financial management. The student receives training in accounting, economics, business law, and elective fields, which provides a balanced background for specialization in finance.

The principal objective of the program is to prepare students for managerial positions in such fields of business finance as commercial banking, investment banking, securities brokerage, trust management, and property management. The program also provides training for employment with governmental agencies engaged in lending operations and regulation of securities markets.

## FRESHMAN AND SOPHOMORE YEARS

(See page 147)

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 | **Business Administration 321**<br>Marketing | (3-0) | 3 |
| **Business Administration 335**<br>Administrative Accounting<br>**Or** | (3-0) | | **Business Administration 341**<br>Corporation Finance | (3-0) | 3 |
| **Mathematics 215**<br>Finite Mathematics | (3-0) | 3 | **Elective** | | 9 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | | | 18 |
| **Elective** | | 4 | | | |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 363**<br>Principles of Management | (3-0) | 3 | **Business Administration 434**<br>Problems in Finance | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investments | (3-0) | 3 | **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Elective** | | 9 | **Elective** | | 8 |
| | | 17 | | | 17 |

## Curriculum in MANAGEMENT

The coordination of human effort to achieve a common goal is necessary in all organized activity regardless of the type of institution involved. The particular job of management is one of coordinating the activities of individual members and groups in an organization by planning, organizing, motivating, and controlling their activities.

Preparing students for business management positions which are not in the specific areas of accounting, marketing, finance, and production is the principal objective of the curriculum in management. The four aspects of the field of management—management analysis, organization theory, management principles, and human relations—are explored in order to aid the student develop managerial skills. The curriculum is designed to give the student a broad background in business education and also to expose him to complex management problems which demand expert skill for analysis and solution.

### FRESHMAN AND SOPHOMORE YEARS

(See page 147)

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 321**<br>Marketing | (3-0) | 3 |
| **Business Administration 363**<br>Principles of Management | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 335**<br>Administrative Accounting | (3-0) | |
| **Or** | | |
| **Mathematics 215**<br>Finite Mathematics | (3-0) | 3 |
| **Business Administration 341**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Industrial Engineering 403**<br>Production Management | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 459**<br>Management Problems | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 9 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 423**<br>Human Relations in Business | (3-0) | 3 |
| **Business Administration 466**<br>Management Policy | (3-0) | 3 |
| **Elective** | | 11 |
| | | 17 |

## Curriculum in MARKETING

The field of marketing is diversified in the scope of its opportunities. Typical of the fields in which expansion is taking place is retail merchandising. Its major departments include store management, buying, publicity, merchandise planning, research, and personnel work. Market research will make increased demands upon those able to furnish management with the data necessary to keep abreast of marketing changes, to eliminate wasteful marketing methods, and to develop new products. The field of sales administration requires an ever-increasing number of individuals qualified to recruit, select, and train selling personnel. Also in this area lie the important functions of establishing sales territories, setting sales quotas, and sales costing. Personal selling is a field offering many opportunities for employment. In the field of advertising a student may gain added proficiency by electing advertising courses taught in the Department of Journalism.

By careful selection of electives, a student can specialize in one of the different fields of marketing or gain general knowledge in anticipation of starting his own business.

### FRESHMAN AND SOPHOMORE YEARS

(See page 147)

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 321**<br>Marketing | (3-0) | 3 |
| **Business Administration 335**<br>Administrative Accounting | (3-0) | |
| **Or** | | |
| **Mathematics 215**<br>Finite Mathematics | (3-0) | 3 |
| **Geography 204**<br>Economic Geography | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 314**<br>Advertising | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 |
| **Business Administration 341**<br>Corporation Finance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

### SENIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Business Administration 435**<br>Salesmanship | (3-0) | |
| **Or** | | |
| **Business Administration 448**<br>Marketing Problems | (3-0) | 3 |
| **Business Administration 445**<br>Marketing Research | (3-0) | 3 |
| **Elective** | | 11 |
| | | 17 |

| | Th Pr | Cr |
|---|---|---|
| **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 12 |
| | | 17 |

## LIBERAL ARTS

The curricula in liberal arts leading to the degree of Bachelor of Arts offer carefully planned programs of study in selected areas of the humanities and social sciences. They are intended for students whose interests, abilities, and aims are better served by a broad general education than by more specialized technological and scientific studies.

After completing one of these curricula, many students enter directly upon their life work. Others make their liberal arts course the foundation for additional education in a professional or graduate school. Special provision is made for those who wish to begin the study of law before they have completed the program for the Bachelor's degree.

In all of the programs the first two years are given over to introductory work in fundamental subjects. The purpose is to enable the student to attain experience and breadth of view so that he may take a more intelligent part in his own further education. During the last two years the student pursues a major and a minor field of study and appropriate electives, with guidance from the head of his major department and from the Dean of the School of Arts and Sciences.

### MAJOR AND MINOR STUDIES

By April 15 of his sophomore year, the student selects a major and a minor field of study, according to the following directions:

1. One of the following subjects must be chosen as the field of major study: economics, English, history, journalism, mathematics, or modern languages.

2. For his minor study the student may select one of the above subjects other than that of his major study or one of the following: biology, business administration, chemistry, education, entomology, geography, geology and geophysics, government, health and physical education, meteorology, physics, psychology, or sociology.

3. The remainder of the elective work may be taken in any of the areas of study indicated above, or in other departments of the College, subject to the approval of the Dean of Arts and Sciences.

4. To satisfy the requirements for graduation, a student must complete not less than thirty semester hours in his major study, of which at least twelve hours are in advanced courses (above the sophomore level), and not less than eighteen semester hours in his minor study, of which at least six hours are in advanced courses. Upon recommendation of the head of the student's major department, the Dean may authorize the substitution of courses in closely related departments for a limited number of hours in the major or minor study.

## FOREIGN LANGUAGE REQUIREMENT

The student will satisfy the foreign language requirement by completing four semesters of study in one language.

## THE SOPHOMORE SCIENCE REQUIREMENT

A student whose curriculum includes a sophomore science requirement may satisfy this requirement in one of three ways:

1. Normally, he will schedule any two (one each semester) of the following survey courses: Chemistry 106, Geography 203, Geology 205, Physics 211.

2. Alternatively, he may substitute for the two survey courses any two-semester course in chemistry or physics.

3. By special permission of the Dean, he may be allowed to substitute the first semester of the usual two-semester introductory course in chemistry, geology, or physics for the survey course in that science. This last provision is intended to prevent unnecessary duplication in the program of students changing from one curriculum to another or transferring from another institution with science credit equivalent to an introductory rather than a survey course.

## Curriculum in
## ECONOMICS

Most students who major in economics enter upon a business career following their graduation. These students obtain a broad foundation for such a career by combining a judicious selection of courses in business administration with those prescribed in their major program. Other students find it desirable to obtain an undergraduate degree with a major in economics before entering law school. Still others pursue the four-year course in preparation for graduate study leading to careers in teaching, research, or government service.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[2] | (3-0) | 3 |
| **Elective** | | 2 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR[3]

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language[2]** | (3-0) | 3 | **Modern Language[2]** | (3-0) | 3 |
| **Science[4]** | (3-3) | 4 | **Science[4]** | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 | **Economics 320**<br>Economic Development of Europe | (3-0) | 3 |
| **Psychology 207**<br>General Psychology<br>**Or** | (3-0) | | **Economics (elective)** | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Elective[5-6]** | | 7 | **Elective[5-6]** | | 5 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 410**<br>Theory of Income and Employment | (3-0) | 3 | **Economics (elective)** | | 6 |
| **Economics (elective)** | | 6 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 8 | **Elective** | | 8 |
| | | 17 | | | 16 |

NOTES:

1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.
2. See "The Foreign Language Requirement," page 151.
3. The student planning his advanced course of study should consult with the Head of the Department sometime during the second semester of his sophomore year to make out his degree plan. There is available a suggested program of work for those who wish to combine a major in economics with Latin American studies.
4. See "The Sophomore Science Requirement," page 151.
5. Business Administration 304 or 341 can substitute for three semester hours of economics electives.
6. Junior and senior electives are to be selected after consultation with the student's major advisor.

## Curriculum in
## ENGLISH

The curriculum in English is designed for breadth in education. In the Department of English, the English major studies writing skills, the language, and literature. Outside of the Department of English, he studies physical and biological sciences, social sciences, foreign languages, history, and philosophy. A large part of the program, especially in the junior and senior years, is left to the choice of the student. Through electives the student may extend his knowledge in the humanities, sciences, social sciences, or even technological skills. The curriculum for the English major, then, is suitable not only for the student who expects to continue his studies of the humanities in graduate school but also for the student who expects to go into business or to become a student of law or medicine or religion.

The student desiring both a full professional training and a broad general education may in five years complete the requirements for two degrees—Bachelor of Arts in English and Bachelor of Science in any one of the professional fields. For specific degree plans, which are made out for each individual entering this program, the student should consult the Dean of Arts and Sciences and the dean of any other school in which he seeks a professional degree. (For degrees in English and in Engineering, see page 182.)

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 2 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 231**<br>Survey of English Literature | (3-0) | 3 | **English 212**<br>Shakespeare | (3-0) | 3 |
| **History 213**<br>History of England | (3-0) | 3 | **History 214**<br>History of England | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Science**[3] | (3-3) | 4 | **Science**[3] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**<br>The English Language<br>**Or** | (3-0) | | **English (elective)** | (3-0) | 3 |
| **English 310**<br>Phonetics and Pronunciation | (3-0) | 3 | **English 322**<br>Nineteenth Century Literature | (3-0) | 3 |
| **English 321**<br>Nineteenth Century Literature | (3-0) | 3 | **Elective** | | 12 |
| **Government 206**<br>American National Government | (3-0) | 3 | | | 18 |
| **Elective** | | 8 | | | |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 407**<br>Speaking and Oral Interpretation | (1-2) | 2 | **English (elective)** | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

NOTES:

1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.
2. See "The Foreign Language Requirement," page 151.
3. See "The Sophomore Science Requirement," page 151.

## Curriculum in GOVERNMENT

Courses in government are concerned with human society and the relations and institutions involved in man's existence and well-being as a member of an organized community. The manner in which a given society is governed is an important aspect of its general culture. Many considerations (economic, historical, sociological, psychological, religious, philosophical, and other factors) influence the political processes. For this reason a politically organized community must of necessity be a dynamic institution of man.

In its broadest concept within the liberal arts program, the study of government seeks to understand the way in which the rules and institutions of society are formulated, executed, and established. The center of interest may, depending upon the individual, be considered alternatively as the study of power, of government, of the state, or of human relations in their political context with a focus upon the solution of present-day problems in government. The study of government seeks to prepare the student either for the role of an active participant or leader in government and administration, or for the equally significant role of an informed citizen. Also, the program in instruction is designed to guide students in exploring and understanding political processes, and to lay a sound foundation for further study in government at the graduate level.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 2 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Science**[3] | (3-3) | 4 | **Science**[3] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Government**[4] **(elective)** | | 6 | **Government**[4] **(elective)** | | 6 |
| **History 213**[5]<br>History of England<br>**Or** | (3-0) | | **History 214**[5]<br>History of England<br>**Or** | (3-0) | |
| **History 217**[5]<br>Development of Europe | (3-0) | 3 | **History 218**[5]<br>Development of Europe | (3-0) | 3 |
| **Elective**[6] | | 8 | **Elective**[6] | | 9 |
| | | 17 | | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 403** | **(1-2)** | **2** | **Government[4] (elective)** | | **6** |
| Speaking for Professional Men | | | **Elective[6]** | | **11** |
| **Government[4] (elective)** | | **9** | | | |
| **Elective[6]** | | **6** | | | **17** |
| | | **17** | | | |

NOTES: 1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.

2. See 'The Foreign Language Requirement," page 151.

3. See "The Sophomore Science Requirement," page 151.

4. Of the 33 semester hours of Government courses required for the undergraduate degree in Government, at least 27 hours must be advanced and include at least one advanced course from each of four of the following five categories into which the department's work is divided: (a) Government, Politics, and Public Administration; (b) International Law, Relations, and Organizations; (c) Foreign and Comparative Government; (d) Political Theory; and (e) Public Law.

5. The student has the choice of taking either History 213 and 214, or History 217 and 218.

6. Depending upon the interest of the student and the objectives of his program of study, candidates for the Bachelor of Arts degree with a major in Government shall choose 24 semester hours of their electives from the following courses: Agricultural Economics 422; Biology 325; Business Administration 227, 228, 303; Economics 311, 318, 320, 321, 324, 412; Education 421, 423, 444; English 321, 322, 327, 328, 336, 371, 372; Geography 203, 302, 303, 304, 320; History 302, 315, 318 (or 423 and 424), 321 and 322, 331, 341 and 342; Journalism 406, 409, 465; Liberal Arts 301, 304; advanced hours in any modern language, or at least 6 semester hours in a second modern language provided 12 semester hours are completed in one modern language; Psychology 207 or 302; Sociology 205, 320.

Students who complete both the requirements for a teaching certificate and the senior ROTC program may substitute Air Science 342 (3 sem. hrs.), 401 (1 sem. hr.), and 402 (1 sem. hr.), or Military Science 421 (3 sem. hrs.) and 422 (3 sem. hrs.) for a like number of hours in the above enumerated electives; but Air Science 301, and Military Science 321 and 322, and Education 425 (6 sem. hrs.) must come from the remaining unrestricted elective hours.

The student should confine his minor to some field in the humanities or social sciences, or a related field. Any problem in developing the required number of hours for a minor should be discussed with the Head of the Department of History and Government.

## Curriculum in
## HISTORY

Through a major in history a student may provide the basis for a broad liberal education, and at the same time find a useful vocation or avocation. History majors find employment opportunities in public school teaching, museum and archives work, state and national park service, diplomatic and consular service, public relations and public information offices, and in writing, research, and bibliographical work.

Many students find it desirable to obtain an undergraduate degree with a major in history and a minor in some related field such as economics, English, government, modern languages, or sociology before entering law school, seminary training, regular military service, and certain careers in industry and government.

The program in history provides excellent preparation for the further study of history beyond the baccalaureate degree.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101[1]** | **(2-3)** | **3** | **Biology 107[1]** | **(2-3)** | **3** |
| General Botany of Seed Plants | | | Vertebrate Zoology | | |
| **English 103** | **(3-0)** | **3** | **English 104** | **(3-0)** | **3** |
| Composition and Rhetoric | | | Composition and Rhetoric | | |
| **History 105** | **(3-0)** | **3** | **History 106** | **(3-0)** | **3** |
| History of the United States | | | History of the United States | | |
| **Mathematics 102** | **(3-0)** | **3** | **Mathematics 103** | **(3-0)** | **3** |
| Algebra | | | Plane Trigonometry | | |
| **Military or Air Science** | **(0-2)** | **1** | **Military or Air Science** | **(0-2)** | **1** |
| **Modern Language[2]** | **(3-0)** | **3** | **Modern Language[2]** | **(3-0)** | **3** |
| **Physical Education 101** | **(0-2)** | **R** | **Elective** | | **2** |
| | | **16** | **Physical Education 102** | **(0-2)** | **R** |
| | | | | | **18** |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **History 217**<br>Development of Europe | (3-0) | 3 | **History 218**<br>Development of Europe | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Science**[3] | (3-3) | 4 | **Science**[3] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Government 206**<br>American National Government | (3-0) | 3 | **Government 207**<br>State and Local Government | (3-0) | 3 |
| **History (elective)** | | 6 | **History (elective)** | | 6 |
| **Elective**[4] | | 8 | **Elective**[4] | | 9 |
| | | 17 | | | 18 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **History (elective)** | | 3 |
| **History (elective)** | | 6 | **Elective**[4] | | 14 |
| **Elective**[4] | | 9 | | | 17 |
| | | 17 | | | |

NOTES:
1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.
2. See "The Foreign Language Requirement," page 151.
3. See "The Sophomore Science Requirement," page 151.
4. Effective for classes entering in September 1963 and thereafter. Depending upon the interest of the student and the objectives of his program of study, candidates for the Bachelor of Arts degree with a major in History shall choose 30 semester hours of their electives from the following categories: Agricultural Economics 422; Business Administration 227, 228, 303; Biology 325; Economics 311, 318, 320, 321, 324, 412; Education 421, 423, 444; English 321, 322, 327, 328, 336, 371, 372; Geography 203, 302, 303, 304, 320; Government 308, 310, 315, 320, 321, 325, 331, 333, 335, 436, 441; Journalism 406, 409, 465; Liberal Arts 301, 304; advanced hours in any modern language, or at least 6 semester hours in a second modern language provided 12 semester hours are completed in one modern language; Psychology 207 or 302; Sociology 205, 320.

   Students who complete both the requirements for a teaching certificate and the senior ROTC program may substitute Air Science 342 (3 sem. hrs.), 401 (1 sem. hr.), and 402 (1 sem. hr.), or Military Science 421 (3 sem. hrs.) and 422 (3 sem. hrs.) for a like number of hours in the above enumerated electives; but Air Science 301, and Military Science 321 and 322, and Education 425 (6 sem. hrs.) must come from the remaining unrestricted elective hours.

   The student should confine his minor to some field in the Humanities or Social Sciences, or a related field. Any problem in developing the required number of hours for a minor should be discussed with the Head of the Department of History and Government.

## Curriculum in JOURNALISM

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Journalism 102**<br>Communications Media and Principles | (2-0) | 2 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Modern Language**[1] | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Science**[2] | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 16 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Journalism 201**<br>News Writing | (2-3) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 232**<br>Survey of English Literature | (3-0) | 3 |
| **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Journalism (elective)** | | 6 |
| **Elective** | | 8 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 211**<br>Business Law<br>**Or**<br>**Business Administration 321**<br>Marketing | (3-0)<br><br><br>(3-0) | 3 |
| **English (elective)**[3] | | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 |
| **Journalism (elective)** | | 3 |
| **Elective** | | 4 |
| | | 16 |

## SUMMER WORK

Journalism 300; Summer Practice, ten weeks, required.

## SENIOR YEAR

| | | |
|---|---|---|
| **English (elective)** | | 3 |
| **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Journalism 409**<br>History and Principles of Journalism | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 420**<br>Law of the Press | (3-0) | 3 |
| **Journalism (elective)** | | 6 |
| **Elective** | | 6 |
| | | 17 |

NOTES:
1. See "The Foreign Language Requirement," page 151.
2. The student may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. It is recommended that the student select any one of the following: English 325, 328, 340, 350, 371, 375.
4. The Journalism Department has assembled information on the various areas of emphasis which will prove a valuable guide to a student planning his advanced course of study and choosing his electives at the beginning of the junior year.
5. The Journalism Department, in cooperation with the daily newspapers, radio and television stations, and magazines of the area, offers a 10-week professional internship program for selected students who have demonstrated superior ability. These internships are available during the summer following the junior year.
6. For further information on agricultural journalism, see page 121.

## Curriculum in MATHEMATICS

The curriculum in the Department of Mathematics is designed to give the student a broad liberal education as well as to provide him with the essentials for a career in mathematics.

The demand for pure mathematicians as well as applied mathematicians has recently become very great in industry, government, and university work. This demand is found at the bachelor's, master's, and doctor's levels. The Department of Mathematics offers programs in pure and applied mathematics, including numerical analysis, to help meet this demand.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 16 |
| | | 17 | | | |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 | **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Mathematics (elective)** | | 6 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 |
| **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 | **Elective** | | 5 |
| **Elective** | | 5 | | | 17 |
| | | 17 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Mathematics (elective)** | | 3 |
| **Mathematics (elective)** | | 3 | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

NOTES: 1. The minor field of study should be chosen only after consultation with the Head of the Department of Mathematics, who will help the student arrange a program appropriate to his plans following graduation.

2. Students planning to enter the Graduate School should elect Mathematics 409 and 415.

## Curriculum in
## MODERN LANGUAGES

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Elective** | | 2 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Elective**[3] | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Elective**[3] | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **English 309**<br>The English Language | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 5 |
| | | 17 |

| | | |
|---|---|---|
| **English 310**<br>Phonetics and Pronunciation | (3-0) | 3 |
| **Modern Language**<br>Spanish | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 341**<br>South America to 1825 | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>Spanish | | 2 |
| **Elective** | | 7 |
| | | 17 |

| | | |
|---|---|---|
| **History 342**<br>South America Since Independence | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>Spanish | | 2 |
| **Elective** | | 9 |
| | | 17 |

NOTES:

1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.
2. See "The Sophomore Science Requirement," page 151.
3. Students who intend to take three years of German or Russian will begin the study of that language in the sophomore year in place of the elective.
4. In case of unavoidable conflict with another required course, a substitution in the field of history will be allowed upon approval by the Head of the Department and the Dean of the School of Arts and Sciences.
5. Students who begin the study of Spanish with Modern Language 105 will take a 3-hour course in literature and reduce electives by one hour.
6. Recommended electives: Advanced courses in economics, English, geography, history.
7. For most students majoring in modern languages, economics, English, history, or geography are logical minors.

## Curriculum in
## PRE-LAW

Students who plan to obtain an undergraduate degree before undertaking the study of law will normally register for one of the regular degree programs. Particularly appropriate are the programs in business administration, economics, English, and history. Students who plan to complete no more than three years of undergraduate work before entering law school will matriculate in the three-year preparatory program listed below. Any student who completes this program may still earn a Bachelor of Arts degree with a major in history and a minor in economics by completing one additional year of course work as follows: 12 semester hours of history selected from History 302, 315, 318 (or 423 and 424), 331, 411, and 421; Economics 321, 324; English 403; and 16 hours of electives, including if possible, Business Administration 303.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 | **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** |  | 1 |
|  |  |  | **Physical Education 102** | (0-2) | R |
|  |  | 16 |  |  | 17 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 319**<br>Economic Development of the United States | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 | **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
|  |  | 18 |  |  | 18 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Government 207**<br>State and Local Government | (3-0) | 3 |
| **History 213**<br>History of England | (3-0) | 3 | **Government 308**<br>United States Constitutional Development | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 | **History 214**<br>History of England | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **Elective** |  | 3 | **Elective** |  | 3 |
|  |  | 18 |  |  | 18 |

NOTES:

1. See "The Foreign Language Requirement," page 151.
2. To satisfy the requirement in physical science, the student may choose one of the following: Chemistry 101, 102 or Physics 201, 202.
3. The American Bar Association minimum requirement for admission to an accredited law school is three years of acceptable college work. Students who plan to seek admission to a law school after completing the three-year program listed above are strongly advised to check the program with the registrar of the school of their choice before beginning the third year. If necessary to meet specific

requirements, substitutions may be approved by the Dean of the School of Arts and Sciences.

Students planning to attend the Law School of the University of Texas must use the 6 semester hours of elective in the junior year for advanced courses (300-400 level) in economics, government, history, or sociology.

4. A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year pre-law curriculum here and at least one year at an accredited law school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

## PSYCHOLOGY AND PREPARATION FOR TEACHING

### Curriculum in
### PSYCHOLOGY

The degree program in psychology provides the necessary background for subsequent professional training at the graduate level, especially in the fields of industrial and experimental psychology. Alternately, it offers a broad scientific base for on-the-job training in the armed services or in industry.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English (Literature elective)** | | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 202**[1]<br>College Physics | (3-3) | 4 |
| **Physics 201**[1]<br>College Physics | (3-3) | 4 | **Psychology (elective)** | | 3 |
| **Psychology 207**[2]<br>General Psychology | (3-0) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 318**<br>Economics of Labor | (3-0) | 3 | **Education 439**[3]<br>Educational Statistics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Psychology 406**<br>Psychology of Learning | (3-0) | 3 |
| **Psychology 309**<br>Differential Psychology | (3-0) | 3 | **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Elective** | | 8 |
| **Elective** | | 6 | | | 17 |
| | | 18 | | | |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Psychology 403**<br>Dynamics of Human Behavior | (3-0) | 3 | **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Sociology 311**[3]<br>Social Psychology | (3-0) | 3 | **Psychology 408**<br>Experimental Psychology | (2-3) | 3 |
| **Elective** |  | 8 | **Psychology (elective)** |  | 3 |
|  |  | 17 | **Elective** |  | 5 |
|  |  |  |  |  | 17 |

NOTES: 1. The following substitutions for Physics 201 and 202 may be made with the approval of the student's advisors: 8 additional hours of chemistry; or 6 additional hours of zoology involving laboratory credit, plus 2 hours of elective; or Genetics 301 and 4 hours in physics.

2. Psychology 303 may be substituted for Psychology 207.

3. Education 439 and Sociology 311 will count as hours in psychology.

## EDUCATION: PREPARATION FOR TEACHING

The Department of Education and Psychology offers the following curricula: (1) a curriculum in psychology leading to the degree of Bachelor of Science; (2) a teacher education program in education leading to the degree of Bachelor of Science or Bachelor of Arts. The degree of Bachelor of Arts will require twelve hours of modern language. Students desiring to teach in the public schools may choose to major either in education or in a subject-matter area such as biology or mathematics.

Candidates preparing for work in the teacher education fields should select their courses under the guidance of the departmental advisor. Students will be eligible to receive the provisional certificate upon completing the requirements for the Bachelor's degree and being recommended by the Department to the Texas Education Agency. The Department of Education and Psychology also offers advanced undergraduate and graduate courses in preparation for certification at the professional level as classroom teachers, visiting teachers, counselors, supervisors, principals, and superintendents.

A student majoring in education in the Department of Education and Psychology or working toward the provisional or the professional certificate will be assigned an advisor who will counsel with him during his teacher education program. Education majors in the Department of Education and Psychology will follow the program outlined on page 164.

Students majoring in subject-matter departments and working toward a provisional secondary certificate must meet the minimum requirements described below:

1. Twelve semester hours of professional development in education and psychology on the advanced undergraduate level.
2. Six semester hours in supervised teaching.
3. Forty-eight semester hours in academic specialization.
   a. Twenty-four semester hours in each of two teaching fields (12 semester hours advanced credit in each).
   b. Forty-eight semester hours in a composite field (18 semester hours advanced credit).
4. Approximately two years or fifty per cent of the total four-year program must be in academic foundations including the institutional requirements for the Bachelor's degree. The specific requirements in the arts and sciences include English, 12 semester hours; American history, 6 semester hours; government, 3-6 semester hours; and 12 semester hours from two of the following: science, mathematics, foreign language.

To meet the requirements for the professional certificate, the student must have at least three years of teaching experience and must have completed an approved program of at least thirty semester hours of graduate work beyond the Bachelor's degree requirements.

## PREPARATION FOR TEACHING WITH A MAJOR IN EDUCATION

I. Academic Foundations ........ 60 hours

| | |
|---|---|
| Biological Science | 6 hours |
| Economics | 3 hours |
| English | 13 hours |
| General Psychology | 3 hours |
| Government | 6 hours |
| History | 6 hours |
| Mathematics | 6 hours |
| Physical Education | 6 hours |
| Physical Science | 8 hours |
| Sociology | 3 hours |

II. Academic Specialization

Plan 1. The student must complete at least 24 semester hours of concentration in each of two subject-matter areas identified with a field of teaching in the secondary schools (12 advanced hours in each). Teaching fields may be selected from the following: biology, business, chemistry, economics, English, government, health and physical education, history, journalism, mathematics, physics, and Spanish. The exact courses to be taken will be chosen with the guidance of the student's advisor and the approval of the head of the department concerned.

Plan 2. The student may complete at least 48 semester hours in a composite field such as social studies or natural sciences (18 advanced hours).

III. Professional Development ........ 18 hours

| | |
|---|---|
| Foundations in American Education | 3 hours |
| Educational Psychology | 3 hours |
| Principles and Practices of Teaching | 3 hours |
| Psychology of Adolescence | 3 hours |
| History and Philosophy of Education | 3 hours |
| Secondary School Curriculum | 3 hours |

IV. Professional Laboratory Experiences ........ 6 hours

Professional laboratory experiences consist of actual and direct contacts with youth in school, home, and community. They include observations made in connection with courses in psychology, instructional methods, curriculum, and testing. They also include participation in teaching activities during which the student accepts the direct responsibility for the success of a group of youth in a school situation. This experience will be given no earlier than the student's senior year. Application for enrollment in supervised teaching must be made the semester prior to enrollment and approved by the student's advisor.

V. Professional Electives ........ 6 hours

The student will be required to take 6 hours of professional development in the field of education or psychology upon the recommendation and approval of his advisor.

VI. Electives

The student will select electives to satisfy the college requirements of a total of 137 semester hours for the Bachelor's degree in Arts and Sciences. These hours will be chosen with the consent of his advisor.

## Curriculum in EDUCATION

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101** | (2-3) | 3 |
| General Botany of Seed Plants | | |
| **Chemistry 101** | (3-3) | 4 |
| General Chemistry | | |
| **English 103** | (3-0) | 3 |
| Composition and Rhetoric | | |
| **History 105** | (3-0) | 3 |
| History of the United States | | |
| **Mathematics 102** | (3-0) | 3 |
| Algebra | | |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107** | (2-3) | 3 |
| Vertebrate Zoology | | |
| **Chemistry 102** | (3-3) | 4 |
| General Chemistry | | |
| **English 104** | (3-0) | 3 |
| Composition and Rhetoric | | |
| **History 106** | (3-0) | 3 |
| History of the United States | | |
| **Mathematics 103** | (3-0) | |
| Plane Trigonometry | | |
| **Or** | | |
| **Mathematics 110** | (3-0) | 3 |
| Survey Course in Mathematics | | |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Education 215** | (3-0) | 3 |
| Foundations of American Education | | |
| **English 203** | (2-0) | |
| Introduction to Literature | | |
| **Or** | | |
| **English 210** | (2-0) | 2 |
| Introduction to Logical Discourse | | |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207** | (3-0) | 3 |
| General Psychology | | |
| **Elective** | | 8 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 203** | (3-0) | 3 |
| Principles of Economics | | |
| **English (elective)** | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 301** | (3-0) | 3 |
| Educational Psychology | | |
| **Elective** | | 7 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Education 423** | (3-0) | 3 |
| Principles and Practices of Teaching | | |
| **Government 206** | (3-0) | 3 |
| American National Government | | |
| **Physical Education 213** | (3-0) | 3 |
| Introduction to Health and Physical Education | | |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **Government 207** | (3-0) | 3 |
| State and Local Government | | |
| **Psychology 323** | (3-0) | 3 |
| Psychology of Adolescence | | |
| **Sociology 206** | (3-0) | 3 |
| Social Institutions and Processes | | |
| **Elective** | | 9 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Education 421** | (3-0) | 3 |
| History and Philosophy of Education | | |
| **Education 444** | (3-0) | 3 |
| Secondary School Curriculum | | |
| **Education (elective)** | | 3 |
| **Health Education 415** | (3-0) | 3 |
| Secondary School Health Education | | |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **Education 425** | (2-12) | 6 |
| Supervised Student Teaching | | |
| **Education (elective)** | | 3 |
| **English 403** | (1-2) | 2 |
| Speaking for Professional Men | | |
| **Elective** | | 3 |
| | | 14 |

NOTES: 1. With the consent of the student's advisor, the following substitutions may be made in the program outlined above:

a. Biological Sciences. A minimum of 6 hours of biological science is required. For Biology 101 and 107, students may substitute Biology 115 (3-3) and Biology 330 (2-0) or Biology 337 (2-0).

b. Physical Science. A minimum of 8 hours of physical science is required. For Chemistry 101 and 102, students may substitute Physics 201 (3-3) and 202 (3-3), or select 8 hours from these courses: Chemistry 106 (3-3), Physics 211 (3-3), Geology 205 (3-3), and Geography 203 (3-3).

c. Education 215. A student entering upon a certificate or degree program with junior or senior classification may substitute a more advanced course in education for Education 215.

d. Physical Education 213, Health Education 415. A student may substitute approved courses in his teaching major or minor for Physical Education 213 and/or Health Education 415.

2. The English elective in the sophomore year should be chosen from literature courses. Students planning to teach English in the secondary schools may substitute for English 203 or 210 a 3-hour English course chosen with the consent of the advisor. If a student writes unsatisfactorily, he may be required to take an additional course in writing, such as English 301.

3. In choosing electives, the student should keep in mind the requirements of his subject-matter area of teaching specialization.

## HEALTH AND PHYSICAL EDUCATION

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; (3) athletic trainer; or (4) corrective therapist. The Bachelor's degree is granted students who complete the prescribed program of studies in professional education, physical education, and general education, and establish a second teaching major in one of the usual secondary school subject matter fields. The choice of a second teaching major may be made only with the approval of the Head of the Department of Health and Physical Education.

Upon completion of the prescribed curriculum and recommendation to the Texas Education Agency, the student will be eligible for (1) the All-Grade Level Certificate in Health and Physical Education and (2) Secondary School Certificate.

### Corrective Therapy

This program is offered in cooperation with the Veterans Administration to prepare specialists in rehabilitation through corrective therapy. This program includes a six-week clinical training period at the Veterans Administration Hospital in Houston. Graduates of this program find employment opportunities with the Veterans Administration, private hospitals, or other organizations concerned with physical rehabilitation.

## Curriculum in
## PHYSICAL EDUCATION

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**[1]<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**[1]<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 219**<br>Mammalian Anatomy | (2-3) | 3 | **Biology 220**<br>Physiology and Hygiene | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Health Education 218**<br>Athletic Injuries | (1-3) | 2 |
| **Health Education 216**<br>First Aid | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physical Education 212**<br>Physical Education Activities | (1-3) | 2 |
| **Physical Education 211**<br>Physical Education Activities | (1-3) | 2 | **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 | **Education 423**<br>Principles and Practices of Teaching | (3-0) | 3 |
| **Physical Education 316**<br>Secondary School Physical Education | (3-0) | 3 | **Health Education 421**<br>Elementary School Health Education | (3-0) | 3 |
| **Physical Education 427**<br>Remedial Exercises | (3-0) | 3 | **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 | **Psychology 307**<br>Child Growth and Development | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 6 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Education (elective)**[3] | (3-0) | 3 | **Physical Education 423**<br>Administration of Health<br>and Physical Education | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Physical Education 425**<br>Tests and Measurements | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 | **Physical Education 450**<br>Directed Teaching | (2-12) | 6 |
| **Elective** | | 10 | **Elective** | | 3 |
| | | 18 | | | 15 |

NOTES:
1. History 325, 326 may be substituted for History 105, 106.
2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. Electives in Education may be chosen from any one of the following: Education 421, 427, 439.

## SCIENCE

Science programs in the School of Arts and Sciences are administered by the following departments: Biology, Chemistry, Oceanography and Meteorology, and Physics.

The several curricula in science are planned for those students whose interests and abilities lie in the direction of seeking scientific truths and relations previously unknown or not understood in the world about us and of bringing these truths to bear on problems affecting the well-being of mankind. Because many students do not discover the nature of their interests or abilities until they have followed a curriculum in agriculture or engineering for a year or more, the curricula in science are so arranged that a student may change to science with a minimum of loss in semester hour credit.

The curricula are designed to serve the following purposes:

1. To prepare students for research in basic science, usually after further study at the graduate level.
2. To prepare teachers of science in secondary schools and other institutions of learning.
3. To provide the necessary undergraduate foundation for students planning to study medicine or kindred fields.
4. To afford a broad scientific training for students who desire it before entering some field of applied science in industry or government service.

## Curriculum in
## BOTANY

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 | **Modern Language**<br>French or German | (3-0) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 | **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Botany elective)** | | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Elective** | | 5 |
| | | 17 |

# Curriculum in CHEMISTRY

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 16 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **Chemistry 226**<br>Chemical Calculations | (2-0) | 2 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Modern Language[1]**<br>French or German | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Chemistry 380**<br>Chemical Bibliography | (1-0) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Modern Language[1]**<br>French or German | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Analysis | (2-6) | 4 | **Chemistry 464**<br>Nuclear and Radiochemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 2 | | | |
| | | 18 | | | 16 |

NOTES: 1. See "The Foreign Language Requirement," page 151.

2. A program combining the basic requirements for a Bachelor of Science degree in Chemistry with premedical requirements is available. Students completing this four-year program will receive a degree certified by the American Chemical Society and at the same time satisfy all the premedical requirements. Mimeographed copies of this program are available at the Department of Chemistry and from the Chairman of the College Premedical Committee in the Department of Biology.

3. The elective hours must include 3 hours of an approved humanities course.

# Curriculum in
# ENTOMOLOGY

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 | **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Elective** | | 3 | **Modern Language**[1] | (3-0) | 3 |
| | | 16 | **Elective** | | 2 |
| | | | | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 6 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

NOTES: 1. See "The Foreign Language Requirements," page 151.

2. Science electives should usually be selected from the following courses:

| | | |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 |
| **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |

## Curriculum in
## METEOROLOGY

Meteorology is the science of planetary atmospheres and their phenomena. Within the broad field of geophysics, it is concerned with physical and chemical processes and states within the earth's atmosphere and at the earth's surface. The objective of terrestrial meteorology is to determine the natural and physicochemical controls of the atmosphere and to apply this knowledge in various ways benefiting life and human endeavor.

Weather and climate through the ages have shaped the physical and biological features of the earth and have guided the course of human activities. However, it is only through quite recent, and continuing, developments in technology, communications, and transportation that sufficient information has been obtained about the atmosphere to enable meteorology to emerge as a separate college study. While satisfying public interest in the weather has been the major object in meteorology, the last few years have witnessed rapidly expanding applications in agriculture, engineering, industry, business, commerce, space exploration and travel, and national defense.

### For classes entering in September 1963 and thereafter

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 16 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Meteorology 305**<br>General Meteorology | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Meteorology 315**<br>Meteorological Instruments and Observations | (3-3) | 4 |
| **Meteorology 335**<br>Atmospheric Statics and Thermodynamics | (2-0) | 2 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Meteorology 324**<br>Physical and Regional Climatology | (3-0) | 3 |
| **Meteorology 336**<br>Atmospheric Motions | (3-0) | 3 |
| **Meteorology 451**<br>Fundamentals of Meteorological Analysis | (1-9) | 4 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 |
| **Meteorology 452**<br>Weather Analysis and Prognosis | (1-6) | 3 |
| **Elective (Meteorological or Technical)** | | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Meteorology 425**<br>Methods in Climatology | (3-3) | 4 |
| **Meteorology 446**<br>Physical Meteorology | (3-0) | 3 |
| **Meteorology (elective)** | | 3 |
| **Technical Elective** | | 4 |
| **Elective** | | 3 |
| | | 17 |

## For the class graduating in 1965-66

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Meteorology 305**<br>General Meteorology | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | | 3 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Meteorology 315**<br>Meteorological Instruments and Observations | (3-3) | 4 |
| **Meteorology 335**<br>Atmospheric Statics and Thermodynamics | (2-0) | 2 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Meteorology 324**<br>Physical and Regional Climatology | (3-0) | 3 |
| **Meteorology 336**<br>Atmospheric Motions | (3-0) | 3 |
| **Meteorology 451**<br>Fundamentals of Meteorological Analysis | (1-9) | 4 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Meteorology 425**<br>Methods in Climatology | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Meteorology 446**<br>Physical Meteorology | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 | **Meteorology (elective)** | | 3 |
| **Meteorology 452**<br>Weather Analysis and Prognosis | (1-6) | 3 | **Technical Elective** | | 4 |
| **Elective (Meteorological or Technical)** | | 3 | **Elective** | | 3 |
| **Elective** | | 3 | | | 17 |
| | | 17 | | | |

## For the class graduating in 1964-65

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 337**<br>Organic Evolution | (2-0) | 2 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Meteorology 324**<br>Physical and Regional Climatology | (3-0) | 3 |
| **Meteorology 305**<br>General Meteorology | (3-0) | 3 | **Meteorology 336**<br>Atmospheric Motions | (3-0) | 3 |
| **Meteorology 315**<br>Meteorological Instruments and Observations | (3-3) | 4 | **Meteorology 451**<br>Fundamentals of Meteorological Analysis | (1-9) | 4 |
| **Meteorology 335**<br>Atmospheric Statics and Thermodynamics | (2-0) | 2 | **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Meteorology 425**<br>Methods in Climatology | (3-3) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Meteorology 446**<br>Physical Meteorology | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 | **Technical Elective** | | 4 |
| **Meteorology 452**<br>Weather Analysis and Prognosis | (1-6) | 3 | **Elective (Meteorological or Technical)** | | 3 |
| **Meteorology 485**<br>Problems | | 1 | **Elective** | | 3 |
| **Elective** | | 3 | | | 17 |
| | | 16 | | | |

## For the class graduating in 1963-64

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 | **Meteorology 458**<br>Weather Analysis | (1-12) | 5 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 | **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Meteorology 457**<br>Fundamentals of Weather Analysis | (1-12) | 5 | **Technical Elective** | | 4 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 17 |

## Electives in METEOROLOGY

| | | | | | |
|---|---|---|---|---|---|
| **Meteorology 435**<br>Dynamic Meteorology | (3-0) | 3 | **Meteorology 479**<br>Military Applications of Meteorology | (3-0) | 3 |
| **Meteorology 453**<br>Synoptic Meteorology | (1-6) | 3 | **Meteorology 481**<br>Seminar | (1-0) | 1 |
| **Meteorology 467**<br>Marine Meteorology | (3-0) | 3 | **Meteorology 485**<br>Problems | | 1 to 3 |
| **Meteorology 475**<br>Radar Meteorology | (3-0) | 3 | | | |

## Technical Electives for METEOROLOGY

| Course | Th-Pr | Cr |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 302**<br>Mechanical Properties of Matter | (3-0) | 3 |
| **Physics 314**<br>Survey of Astronomy | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |
| **Physics 420**<br>Introduction to Astrophysics | (3-0) | 3 |

NOTE: Electives shall be chosen and approved according to the following policy: Not more than 12 elective hours of advanced courses in meteorology will be permitted toward requirements for graduation.

## Curriculum in MICROBIOLOGY

A major in microbiology offers thorough and comprehensive training in the biology of bacteria and certain of the algae, fungi, and protozoa that supplement the study of the microorganisms in their relation to medicine, industry, and agriculture. The curriculum is intended to equip the student with sound training in the principles of microbial life, as either preparation for graduate study or for a career in either industrial or civil service.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (Microbiology elective)**[1] | | 4 | **Biology (Microbiology elective)**[1] | | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Liberal Arts**[2] | | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Microbiology elective)**[1] | | 4 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Microbiology elective)**[1] | | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

NOTES:

1. Microbiology electives may be satisfied by Biochemistry and Nutrition 430; Biology 327, 353, 433, 438, 457, 608, 630, 647; Dairy Science 320, 326; Statistics 406. Selections should be made with the aid of the student's advisor.
2. Liberal Arts elective may be satisfied by Liberal Arts 301, 304, or 201 and 311.
3. A program combining the basic requirements for a Bachelor of Science degree in Microbiology with pre-medical requirements is available from the Chairman of the College Premedical Committee in the Department of Biology (See page 176).

## OCEANOGRAPHY

Oceanography is the study of the oceans and their boundaries. It is based upon the unity of the sciences of the sea. Effective study of the subject requires thorough previous training in one of the pertinent basic sciences such as biology, chemistry, geology, mathematics, meteorology, and physics, or in engineering. Therefore, much of the work in oceanography is conducted at the graduate level, and the undergraduate program of students who wish to study oceanography must be planned to satisfy certain prerequisite requirements. It is suggested that such students consult regularly during their undergraduate years with the oceanography staff.

Five options, the biological, chemical, geological, physical, and meteorological with their corresponding engineering phases, are offered. The options require different undergraduate programs. These programs are taken in other departments except in the case of meteorological oceanography, where a complete undergraduate program in meteorology is offered in the Oceanography and Meteorology Department.

In the graduate program there are curricula leading to the Master of Science and Doctor of Philosophy degrees in each of the five options in oceanography. Specific prerequisite requirements are set up for each curriculum. In general, these consist of the courses normally required for the degree of Bachelor of Science in one of the basic fields listed above and some course work in each of the other fields.

Oceanography may be utilized in solving certain problems arising in fisheries work, offshore oil and gas operations, navigation, prevention of beach erosion, weather forecasting, recreation, extraction of raw materials from the sea, marine construction, coastal sanitation, military operations, fresh water supply, and many other activities. It requires broad interests, numerous skills, a real liking for the sea, and an adaptability to shipboard life.

## Curriculum in
## PHYSICS

Physics is the science of energy and the interaction of energy and matter. Some physicists are primarily concerned with the discovery and investigation of effects and relations in the physical universe previously unknown or not understood. Others, known as applied physicists, are interested in bringing to the solution of industrial and technical problems, physical effects not previously so applied. When new and better ways are required to obtain and transmit energy or to alter the configuration or constitution of matter, physicists are of service.

Many branches of industry are seeking applied physicists with all levels of professional training from the Bachelor's to the Doctor's degree. Industrial and government-operated research laboratories and colleges and universities are seeking investigators of new physical truths and relations, with professional training beyond the Bachelor's degree. College graduates in physics are far short of the number needed.

The undergraduate curriculum in physics offers a thorough coverage of the phenomena of classical, atomic, nuclear, and solid state physics, while developing the student's mathematical tools to the point where he can deal resourcefully and constructively with these phenomena. It also provides a grounding in related sciences, linguistic techniques, and general education. Elective time permits further broadening of the student's education or a degree of concentration in some related phases of science or engineering.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 16 |
| | | 17 | | | |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 16 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Physics 301**<br>Heat | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 325**<br>Physics Laboratory | (0-3) | 1 | **Physics 302**<br>Mechanical Properties of Matter | (3-0) | 3 |
| **Physics 401**<br>Optics | (3-0) | 3 | **Physics 326**<br>Physics Laboratory | (0-3) | 1 |
| **Elective**[2] | | 4 | **Physics 413**<br>Electricity and Magnetism | (3-0) | 3 |
| | | 17 | **Elective**[2] | | 2 |
| | | | | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Physics 311**<br>Atomic and Nuclear Physics | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 | **Physics 416**<br>Electromagnetic Fields | (3-0) | 3 |
| **Physics 425**<br>Physics Laboratory | (0-3) | 1 | **Physics 424**<br>Physics of Solids | (3-0) | 3 |
| **Elective**[2] | | 7 | **Physics 426**<br>Physics Laboratory | (0-3) | 1 |
| | | 17 | **Elective**[2] | | 6 |
| | | | | | 18 |

NOTES: 1. See "The Foreign Language Requirement," page 151. German or Russian is recommended normally.

2. Electives should be selected in consultation with, and on approval of, the Head of the Department with two objectives in view: (1) to strengthen the broad foundation expected of students who specialize in physics; (2) to intensify the student's program in the direction of a specific competence. For objective (1) are recommended electives in other sciences, especially chemistry; electives in basic engineering courses, such as electric circuit theory, electronics, engineering mechanics, mechanics of materials, metallurgy, thermodynamics, engineering drawing (Engineering Graphics 105), and machine shop (Mechanical Engineering 309); and electives in mathematics, languages, the humanities, and social sciences. Objective (2) is determined by the student's interests and plans for the future. He may aspire to a career of advancing knowledge of fundamental physics through basic research on physical phenomena or through college teaching. In this case the student must plan on postgraduate study and should choose his electives to increase his intellectual equipment in mathematics and to widen his range of acquaintance with subjects in physics and other sciences and fields important for an educated man. If the student is interested in research in physics bearing on a field of some other science, such as chemistry, geology, meteorology, oceanography, or biology, a heavy concentration of electives should be made in that science. The student preparing for a career in high school teaching should elect the requisite courses in education. A student planning to go directly into industry upon graduation should concentrate a large portion of his electives in a sequence of courses proceeding to an advanced stage in, for instance, aerospace engineering, communications and electronics in electrical engineering, or vibrations and the mechanics of materials, or thermodynamics and heat transfer in mechanical engineering.

## Curriculum in
## PRE-MEDICINE AND PRE-DENTISTRY

Students planning to enter a school of medicine or dentistry without first taking a college degree should take the following program:

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (elective)** | | 3 | **Biology (elective)** | | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **Elective** | | 4 |
| | | 19 | | | 19 |

NOTES:

1. Most students admitted to medical and dental schools in the United States have three or more years of pre-professional training. A large proportion hold college degrees. It is therefore recommended that students preparing to enter medical or dental schools plan to complete at least the foregoing three-year program.

2. Four years of college work with the receipt of the baccalaureate degree is the preferred preparation for medical and dental schools. Majors may be obtained in zoology (see page 178) or chemistry (see page 168), and also in physics, microbiology, history, English, and other subjects so long as the requirements for entrance to the professional school are satisfied.

3. A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the the three-year premedical curriculum here and at least one year at a Class A medical school or dental school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

4. Since courses in literature, language, history, and social sciences are not offered in medical or dental schools, leaders in medical education urge prospective medical and dental students to include much of such work in their pre-professional education. Some electives for the junior and senior years in line with this recommendation are:

| | | |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |

Electives available in the sciences related to medicine are:

| | | |
|---|---|---|
| **Biochemistry and Nutrition 410**<br>Introductory Biochemistry | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Biology 343**<br>Histology | (2-3) | 3 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **Biology 422**<br>Microtechnique | (1-6) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Biology 434**<br>Circulatory and Nerve Physiology | (2-3) | 3 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 |
| **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Biology 457**<br>Bacterial Ecology | (2-6) | 4 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Physics 310**<br>Applications of Modern Physics | (2-2) | 3 |

## Curriculum in ZOOLOGY

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (Zoology elective)** | | 3 | **Biology (Zoology elective)** | | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 4 |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 | **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 | **Biology (Zoology elective)** | | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Elective** | | 12 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | | | 17 |
| **Elective** | | 7 | | | |
| | | 17 | | | |

NOTES:

1. See "The Foreign Language Requirement," page 151.
2. The elective hours in Zoology must include 12 hours chosen from the following courses: Biology 343, 344, 422, 433, 434, 435, 436.
3. Elective hours and the remaining hours required for the major should be selected from the following:

| | | |
|---|---|---|
| **Agronomy 304**<br>Plant Breeding | (3-2) | 4 |
| **Animal Husbandry 306**<br>Animal Breeding | (2-2) | 3 |
| ***Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Biology 438**<br>Bacterial Physiology | (2-6) | 4 |
| **Biology 457**<br>Bacterial Ecology | (2-6) | 4 |
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| ***Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |

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*Strongly recommended for all zoology majors.

# THE SCHOOL OF ENGINEERING

## GENERAL STATEMENT

Probably no profession has contributed more to raise the standards of living for mankind and to provide him with the conveniences to make life more enjoyable and the leisure in which to enjoy it, than has engineering. The rapid rate of development in scientific and industrial fields has created a demand for a large number of capable young men in engineering. Today engineering is the second largest profession and employs more men than any other.

The engineer is an applied scientist. It is his responsibility to utilize known laws in the physical sciences and mathematics in ways which make them valuable to mankind. He must understand the physical laws and phenomena and must see how they can be applied. He must conceive the idea, design the product, select the materials, determine the market, plan the production, often design the machines for production, and control costs to the point where the product can be sold at a profit. This involves men, materials, methods, and money.

The present high standards of living in many parts of the world are ample evidence of the work of the engineer. The comforts and conveniences in our homes, the availability of running water, electricity, gas and sewage disposal systems are things that are just taken for granted. The fine automobiles, the excellent highways, the luxurious airplanes, the long range missiles and the orbiting satellites are a few concrete evidences of the work of the engineer. Sometimes known principles and physical laws lie idle and are unused for many, many years before the engineer utilizes them and builds the equipment to make them useful.

Engineering touches nearly every facet of our lives and requires men with depth, breadth, and versatility. Although the fundamental education is the same for all engineers, the field is so broad that specialization is necessary. Usually four years of college are needed to complete the requirements for a Bachelor's degree in some branch of engineering, but some schools are now requiring five. Engineering is becoming more highly technical and involved, and advanced study is highly desirable for those who expect to become specialists of high competence.

Students who expect to enter engineering should make their decision early, so that their courses in both junior high and high school include thorough preparation in mathematics, the physical sciences, English, and the social sciences. Four years of English; two or more years of algebra; a half year of trigonometry; all the geometry, both plane and solid, that is offered; a year each of biology, chemistry, and physics; two years or more in the social sciences; and additional elective credits such as drawing and shopwork form a good foundation. The student should enjoy solving problems, since this is one of the engineer's primary responsibilities.

Employment opportunities for graduate engineers have been quite good for the past 20 years, and it appears that the demand will continue to exceed the supply in the foreseeable future. For those who hold M.S. or Ph.D. degrees, the demand is becoming much stronger and premium salaries are paid for these individuals.

## CURRICULA

### Division of Architecture

Architecture (Five Year Program)

Architectural Construction
(Five Year Program)

Landscape Architecture

**Engineering**

Aerospace Engineering
*Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Geological Engineering
Geology
Geophysics
Industrial Distribution
Industrial Education
  Industrial Arts Teacher Education Option
  Vocational Industrial Teacher Education Option
Industrial Engineering
Industrial Technology
Mechanical Engineering
Petroleum Engineering
Petroleum Engineering (Five Year Program)

**Five-Year Combined Degree Plans**

Students who are interested in two areas of engineering or a business foundation to complement their engineering curriculum may pursue programs which lead to two Bachelor's degrees in five years. The following curricula are examples; students interested in other possible combinations should consult with the Dean of Engineering.

Chemical Engineering—General Business
Civil Engineering—General Business
Geology—Petroleum Engineering
**Industrial Engineering
Petroleum Engineering—General Business
Petroleum Engineering—Chemical Engineering
Petroleum Engineering—Geological Engineering
Petroleum Engineering—Mechanical Engineering

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees, the Bachelor of Science degree in a professional field and the Bachelor of Arts degree in one of the liberal arts curricula (see page 102, "Two Degrees").

## NUCLEAR PROGRAM

The College offers Master of Science and Ph.D. degrees in Nuclear Engineering. An explanation of these plans appears under advanced study.

## ADVANCED STUDY

As the knowledge required for advanced engineering design in industry increases, more and more students are finding it desirable to go beyond the usual four-year course in college. Much of the design in industry today follows the research mode of procedure, the procedure predominantly used in graduate study. Consequently, there has been a growth in graduate study to satisfy the demands of industry for engineers with greater scientific knowledge and research ability. In the future, industry, colleges, and governmental agencies will carry on more and more research, and, therefore, there will continue to be a great demand for engineers with graduate training through the doctorate. It should be pointed out, however, that graduate study is available only to those with more than average ability.

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*Administered jointly by Schools of Agriculture and Engineering.

**A degree of Bachelor of Science in Industrial Engineering may be awarded on the basis of the student's completing the requirements for the degree of Bachelor of Science in Aerospace, Chemical, Civil, Electrical, Mechanical, or Petroleum Engineering and additional required courses.

Students who are interested in pursuing one of these graduate programs should take the regular undergraduate program in Aerospace Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Petroleum Engineering, Chemistry, Mathematics, or Physics. The following are recommended as electives for the undergraduate program, with the most important listed first. These courses should be taken only after consultation with the head of the student's major department.

| | |
|---|---|
| Physics 311 | Atomic and Nuclear Physics |
| Nuclear Engineering 401 | Nuclear Engineering |
| Nuclear Engineering 402 | Industrial Applications of Radioisotopes |

An AGN-201 Nuclear Training Reactor is available for use in the nuclear technology work. In the fall of 1961 the 5 megawatt research reactor in the A. and M. Nuclear Science Center became available for student training and research.

Prospective graduate students should write to the Director of Admissions for a Graduate School Catalogue.

## DIVISION OF ARCHITECTURE

### Curriculum in ARCHITECTURE

Architecture is the creation of physical space within which people live, work, play, and worship. It is a profession which is dedicated to the betterment of the total man-made physical environment. It is often referred to as the "Impresario of the Arts," and it embraces not only the creation of a single building suited to its needs, including the objects about it, but also entire urban areas involving groups of buildings and even entire cities. The architect, therefore, must not only be able to analyze the general objectives, the specific needs and requirements of the individual or community, but to direct and coordinate the various building operations from design conception to completion of a project.

The Division of Architecture offers a program designed to provide young men with a broad and balanced background of fundamental training for professional careers in architecture. The students are encouraged to develop sensibly and to apply their acquired knowledge and skills to solutions of the social and architectural problems of contemporary society. While they are developing their creative abilities, they are encouraged to acquire full recognition of their professional responsibilities to society.

The curriculum is arranged to integrate the technical aspects of materials, equipment, and construction, as well as the social and cultural aspects of art and history of architecture, with its core program in architectural design. The design courses are further strengthened with other related courses in graphic arts, landscape architecture, working drawings, specifications, and professional practice. Design is taught in a series of stages, beginning with basic design in the first and continued through all years as defined in the courses of instruction. The students are assigned problems to be solved individually or by teams. Individual guidance and criticism are given by the instructor, accompanied with group discussions, lectures, and demonstrations. Further direction is given to the use of reference material in the library. Student work is reviewed and judged by a jury of teachers, practicing architects, and on some occasions, the specialists in a particular project.

The Division of Architecture is a member of the Association of Collegiate Schools of Architecture and is on the approved list of schools accepted by the Texas Board of Architectural Examiners. Its curriculum in architecture is five years in length, leading to a degree of Bachelor of Architecture. The curriculum is accredited by the National Architectural Accrediting Board. Graduates of this program often continue their education in advanced degrees in architecture or in the field of city and regional planning.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Military or Air Science** | (0-2) | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 227**<br>Structural Principles | (3-0) | 3 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 301**<br>Design III | (0-15) | 5 | **Architecture 302**<br>Design III | (0-15) | 5 |
| **Architecture 305**<br>Graphic Art | (0-6) | 2 | **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 | **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 401**<br>Design IV | (0-15) | 5 | **Architecture 402**<br>Design IV | (0-15) | 5 |
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 | **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 |
| **Elective (Humanities)** | | 3 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 501**<br>Design V | (0-15) | 5 | **Architecture 502**<br>Design V | (0-15) | 5 |
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 556**<br>City Planning | (2-3) | 3 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Landscape Architecture 411**<br>Landscape Design for the Architect and Engineer | (2-2) | 3 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** | | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| | | 17 | **Government 206**<br>American National Government | (3-0) | 3 |
| | | | | | 16 |

## Curriculum in ARCHITECTURAL CONSTRUCTION

The construction of buildings is one of the major industries in the country. Proper training in technical studies of construction methods, materials, structural systems, soils, equipment, cost estimating, business and real estate laws, and labor management forms a good background for those going into the building construction field.

The construction program offered by the Division of Architecture is designed to prepare young men in this field. The curriculum is parallel with the first two years in architecture, with one exception in the mathematics requirement. This offers the student who has not previously made a definite decision an opportunity to make an intelligent choice of the field in which he is most suited. For the next three years, the curriculum is arranged with courses related to the scope of building construction.

The program leads to a degree of Bachelor of Science in Architectural Construction. Graduates in this degree usually enter the building construction industry as draftsmen, estimators, superintendents of construction, and ultimately develop their own firms as building contractors.

Students in this program become members of a very active student chapter of the Association of General Contractors. Through participation in this organization, the students are kept informed of current developments in this field.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Military or Air Science** | (0-2) | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
|  |  | 19 |  |  | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| **Business Administration 211**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Geology 422**<br>Natural Structural Materials | (2-3) | 3 |
|  |  | 17 |  |  | 16 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 | **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **Elective (Humanities)** |  | 2 |
| **Elective (Humanities)** |  | 2 | **Elective** |  | 3 |
|  |  | 17 |  |  | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 554**<br>Professional Practice | (2-0) | 2 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 | **Elective** |  | 10 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |  |  | 17 |
| **Elective (Humanities)** |  | 3 |  |  |  |
|  |  | 17 |  |  |  |

## Curriculum in
## LANDSCAPE ARCHITECTURE

Landscape architecture is a profession dealing with the art and science of arranging land and water forms and the spaces and objects thereon for the purpose of securing the greatest returns in human use and enjoyment. As in architecture, it is a creative profession concerned with proper and pleasing physical environment. The creative ability of the landscape architect is expressed by his arrangement of forms, the spaces which he produces with land areas for various purposes, his setting of buildings and structures in relation to surrounding topography, and by his use of plant materials, such as trees, shrubs, grasses, and flowers in his design. He must possess an artistic sense, an engineering ability, be skilled in design, have a fundamental knowledge of plant science, and be knowledgeable of the basic elements of land, water, vegetation, and the forces of nature.

The curriculum has been arranged to provide courses which will develop the student logically. Its central core consists of courses in design, the supplementary courses in plant materials, construction, architecture, graphic arts, planning, etc., forming a broad background, together with essential technical training for the professional practice of landscape architecture.

Since the students are physically located with those in architecture, an opportunity is afforded through collaborative problems to establish working relationships which are important to their future professional careers.

The program is four years in length, leading to a degree of Bachelor of Science in Landscape Architecture. Graduates are employed in private practice; by city, state, and regional planning departments; or by city, state, or national park systems. Other opportunities exist in teaching, research, and extension work. Graduates in landscape architecture are prepared for advanced study in city or regional planning.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Landscape Architecture 201**<br>History of Landscape Design | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 16 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Floriculture 425**<br>Landscape Maintenance and Construction | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Landscape Architecture 304**<br>Landscape Construction | (2-3) | 3 | **Landscape Architecture 305**<br>Planting Design | (1-3) | 2 |
| **Landscape Architecture 320**<br>Landscape Design I | (0-12) | 4 | **Landscape Architecture 321**<br>Landscape Design II | (0-12) | 4 |
| **Elective** | | 2 | **Elective** | | 2 |
| | | 17 | | | 17 |

## SUMMER WORK

Landscape Architecture 300 (Summer Practice, 10 Weeks)

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 305**<br>Graphic Art | (0-6) | 2 | **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 | **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Floriculture 319**<br>Exotic Plants | (2-2) | 3 | **Architecture 556**<br>City Planning | (2-3) | 3 |
| **Landscape Architecture 404**<br>Landscape Construction | (2-3) | 3 | **Landscape Architecture 421**<br>Landscape Design IV | (1-15) | 6 |
| **Landscape Architecture 420**<br>Landscape Design III | (1-15) | 6 | **Elective** | | 3 |
| | | 17 | | | 17 |

## Curricula in
## ENGINEERING

With the exception of geology, industrial distribution, industrial education, and industrial technology, all curricula in engineering are identical in the freshman year. Students who expect to enter engineering curricula and are not thoroughly grounded in the fundamentals of algebra and trigonometry are urged to attend a six-week term of summer school prior to the fall semester of the freshman year and take courses in algebra and trigonometry equivalent to Mathematics 102 and 103 at the A. and M. College of Texas. Those students who are not proficient in algebra and trigonometry and who are unable to attend summer school should omit Mathematics 121 and History 105 from their fall semester schedule and take Mathematics 102 and 103. Mathematics 121 should be taken in the spring semester and Mathematics 122 and History 105 in summer school after the freshman year. It is desirable for the student to resume the regular schedule as soon as possible.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

## Curriculum in
## AEROSPACE ENGINEERING

Aerospace engineering is described as the technical activities associated with the development of aerospace vehicles. These include research, analysis, and design in several technical specialties such as aerodynamics, dynamics of aircraft, structures, properties of materials and propulsion.

Aerospace engineering graduates are employed in aerospace industry, government research laboratories, and equipment manufacturing companies in Texas and elsewhere. A considerable number enter the military services as engineering officers. Aerospace engineering graduates are also well qualified for positions in other fields of engineering, since men trained in aerodynamics and the design of high-strength, light-weight structures are in demand in many industries.

The Aerospace Engineering Department has excellent facilities in the new Engineering Building on the campus and at the College-owned Easterwood Airport. Facilities on the campus include a supersonic wind tunnel, an instructional low-speed wind tunnel, a structures laboratory, a materials and process laboratory, and complete shop facilities. The Aeronautical Laboratories, including the large wind tunnel, are located at Easterwood Airport.

The four-year undergraduate curriculum in aerospace engineering leading to the degree of Bachelor of Science includes sound preparation in mathematics, physics, chemistry, English, and mechanics. The junior and senior years are devoted largely to the professional courses in aerodynamics, aircraft structures, aircraft power plants, and aircraft design. The opportunity to elect courses in a desired specialty is provided in the senior year.

**For classes entering in September 1962 and thereafter**

### FRESHMAN YEAR

(See page 188)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Aerospace Engineering 201** | (3-3) | 4 | **Civil Engineering 305** | (3-0) | 3 |
| Elementary Aerodynamics | | | Mechanics of Materials | | |
| **History 106** | (3-0) | 3 | **Economics 203** | (3-0) | 3 |
| History of the United States | | | Principles of Economics | | |
| **Mathematics 307** | (3-0) | 3 | **Mathematics 308** | (3-0) | 3 |
| Calculus | | | Differential Equations | | |
| **Mechanical Engineering 212** | (3-0) | 3 | **Mechanical Engineering 313** | (3-0) | 3 |
| Engineering Mechanics | | | Engineering Mechanics | | |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219** | (3-3) | 4 | **Physics 220** | (3-3) | 4 |
| Sound, Light, Electricity | | | Modern Physics | | |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aerospace Engineering 301** | (3-0) | 3 | **Aerospace Engineering 302** | (1-3) | 2 |
| Theoretical Aerodynamics | | | Experimental Aerodynamics | | |
| **Aerospace Engineering 304** | (3-0) | 3 | **Aerospace Engineering 303** | (3-0) | 3 |
| Elementary Aircraft Structures | | | High Speed Aerodynamics | | |
| **Government 206** | (3-0) | 3 | **Aerospace Engineering 306** | (2-3) | 3 |
| American National Government | | | Strength of Aircraft Materials | | |
| **Mechanical Engineering 323** | (4-0) | 4 | **Electrical Engineering 307** | (3-3) | 4 |
| Thermodynamics | | | Electrical Circuits | | |
| **Mechanical Engineering 338** | (2-3) | 3 | **English 210** | (2-0) | 2 |
| Kinematics and Machine Design | | | Introduction to Logical Discourse | | |
| | | | **Elective (Humanities)** | | 3 |
| | | 16 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Aerospace Engineering 405**<br>Aircraft Structures | (3-0) | 3 |
| **Aerospace Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 |
| **Aerospace Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 15 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Aerospace Engineering 401**<br>Aircraft Design | (1-6) | 3 |
| **Aerospace Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 6 |
| **Elective (Humanities)** | | 3 |
| | | 16 |

## For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | |
|---|---|---|
| **Aerospace Engineering 301**<br>Theoretical Aerodynamics | (3-0) | 3 |
| **Aerospace Engineering 304**<br>Elementary Aircraft Structures | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Aerospace Engineering 302**<br>Experimental Aerodynamics | (1-3) | 2 |
| **Aerospace Engineering 303**<br>High Speed Aerodynamics | (3-0) | 3 |
| **Aerospace Engineering 306**<br>Strength of Aircraft Materials | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 410**[1]<br>Internal Combustion Engines | (3-0) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Aerospace Engineering 405**<br>Aircraft Structures | (3-0) | 3 |
| **Aerospace Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Aerospace Engineering 401**<br>Aircraft Design | (1-6) | 3 |
| **Aerospace Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **Aerospace Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 16 |

NOTES:
1. Mechanical Engineering 410 may be replaced by any junior or senior level course in engineering, mathematics, or physics.
2. At least one of the technical electives in the senior year must be selected from Group A.

## Technical Electives for AERONAUTICAL ENGINEERING

| Group A | | |
|---|---|---|
| **Aerospace Engineering 403**<br>Aerospace Materials Science | (3-0) | 3 |
| **Aerospace Engineering 421**<br>Dynamics of Airplanes | (3-0) | 3 |
| **Structural Mechanics 469**<br>Analysis of Structures | (2-3) | 3 |

| Group B | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 421**<br>Celestial Mechanics | (3-0) | 3 |

## Curriculum in
## AGRICULTURAL ENGINEERING

(See page 119 for a discussion of this curriculum.)

## Curriculum in
## CHEMICAL ENGINEERING

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a coordinated series of unit physical operations and unit chemical processes. The work of the chemical engineer is concerned primarily with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineering became a separate division of engineering with the growth of strictly chemical industries, and it is now recognized as one of the important divisions of engineering, dealing with combustion of fuels, heat treatment of metals and alloys, the preparation of water for potable and industrial use, the refining of petroleum, processing of vegetable oils, the development of electric furnace products, portland cement, lime gypsum, plaster, heavy chemicals, soaps, rubber, corn products, textiles, paper, artificial leather and silks, food products, and other products.

The work of the chemical engineer is the changing of raw materials into finished products with the greatest efficiency and economy. He substitutes a rigid control of processes for guess work and uncertainty and increases the productivity of labor by supplying more efficient processes where the standard and quality of the finished product are revised and the amount of seconds and rejections is reduced. The chemical engineer must also be able to modify a process in order to adapt it to commercial conditions and to select his material for construction with special reference to its use. His work is distinct from that of the chemist on the one hand and the mechanical engineer on the other, though he must have a thorough training in both chemistry and engineering.

The curriculum in chemical engineering is planned to prepare students for the design, construction, and operation of industries in which materials undergo chemical and physical change. The unit operations, such as fluid flow, heat flow, evaporation, drying, distillation, gas absorption, filtration, crushing and grinding, and size separation are basic studies that may be applied to any industry. General chemical processes are also included in the laboratory and classroom work. Research in both of these divisions is fostered by cooperative projects with the Texas Engineering Experiment Station and industrial organizations of the State.

As chemical engineering treats of the processes whereby materials undergo a chemical and physical change, it is apparent that a large number of diversified industries have use for the chemical engineer, not only in the operation and control of processes but in the design of special equipment. Many chemical engineers enter the research laboratory, investigating processes in the laboratory and supervising their operation in the plants, considering carefully the controlling interest of cost as a factor in all industrial operations.

**For classes entering in September 1962 and thereafter**

### FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemical Engineering 204**<br>Elementary Chemical Engineering | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | (3-0) | 3 | **Chemical Engineering 314**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemical Engineering 423**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Elective (Humanities)** | | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| | | 17 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 | **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 424**<br>Unit Operations | (3-0) | 3 | **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 | **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 | | | 17 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 | | | |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 | | | |
| ***Elective (Humanities)** | | 3 | | | |
| | | 19 | | | |

## For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | (3-0) | 3 | **Chemical Engineering 314**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemical Engineering 423**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

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*Three of these hours may be used to satisfy Air Science or Military Science requirements.

### SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | **(3-0)** | **3** |
| **Chemical Engineering 424**<br>Unit Operations | **(3-0** | **3** |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | **(0-3)** | **1** |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | **(0-3)** | **1** |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | **(3-0)** | **3** |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | **(2-0)** | **2** |
| **Chemical Engineering 481**<br>Seminar | **(1-0)** | **1** |
| **Elective (Humanities)** | | **3** |
| | | **17** |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemical Engineering 426**<br>Plant Design | **(2-6)** | **4** |
| **Chemical Engineering 428**<br>Industrial Chemical Processes | **(3-0)** | **3** |
| **Chemical Engineering 464**<br>Chemical Engineering Kinetics | **(3-0)** | **3** |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | **(3-3)** | **4** |
| **Government 206**<br>American National Government | **(3-0)** | **3** |
| | | **17** |

## Curriculum in
## CIVIL ENGINEERING

The curriculum in civil engineering has for its objective the thorough grounding of young men in the underlying principles of the basic sciences and engineering. Training or practice in the art of applying these principles to problems encountered in practice is given in the drafting room, laboratories, and in the field so as to enable the graduate to give satisfactory service in an engineering organization immediately upon graduation.

During the first three years the subject matter of the courses is common to all phases of civil engineering, such as surveying, highway engineering, mechanics, strength of materials, hydraulics, and stress analysis. In the fourth year, the student is given an opportunity to specialize moderately in structural engineering, highway engineering, hydraulic engineering, or municipal and sanitary engineering. In addition, courses in cost estimating and engineering economy are required of all the students to give them an understanding of the importance of these matters in the practice of civil engineering. Students who are interested in construction engineering should consider the possibility of obtaining a Bachelor of Science degree in Civil Engineering and a Bachelor of Business Administration degree. Copies of a degree plan to satisfy the requirements for both degrees may be obtained from the Civil Engineering Department.

The moderate specialization indicated above does not restrict the student to securing employment in a special field. The curriculum is so planned as to make it possible for him to undertake professional practice embracing the following: surveying; water supply; sewerage; the planning, design, and construction of buildings, bridges, earthen dams, reservoirs, canals, and the conventional types of foundations required for all of the structures; planning, design, construction, and maintenance of roads and highways; traffic engineering; planning and execution of sanitary measures for rural and urban communities; administration of city business as city manager; industrial, academic, and governmental research of civil engineering matters; and technical service of various kinds leading to executive positions in industry.

**For classes entering in September 1962 and thereafter**

### FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## SUMMER WORK

Civil Engineering 300, Summer Surveying Practice, six weeks, credit 5

## JUNIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 15 |

| | | |
|---|---|---|
| **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 344**<br>Reinforced Concrete Structures | (3-3) | 4 |
| **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 443**<br>Materials of Construction | (2-3) | 3 |
| **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Technical Elective** | | 3 |
| | | 16 |

### For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| | | 15 |

| | | |
|---|---|---|
| **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 344**<br>Reinforced Concrete Structures | (3-3) | 4 |
| **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 |
| **Civil Engineering 443**<br>Materials of Construction | (1-3) | 2 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

## Technical Electives for
## CIVIL ENGINEERING

| (Offered in Fall Semester only) | | |
|---|---|---|
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 |
| **Civil Engineering 435**<br>Soil Engineering | (2-3) | 3 |
| **Civil Engineering 457**<br>Traffic Engineering | (3-0) | 3 |
| **Civil Engineering 463**<br>Hydrology | (3-0) | 3 |
| **Geology 441**<br>Advanced Engineering Geology | (3-3) | 4 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |

| (Offered in Spring Semester only) | | |
|---|---|---|
| **Civil Engineering 403**<br>Sanitary Design | (2-3) | 3 |
| **Civil Engineering 417**<br>Bituminous Materials | (2-3) | 3 |
| **Civil Engineering 456**<br>Highway Design | (2-3) | 3 |
| **Civil Engineering 458**<br>Hydraulic Engineering | (3-0) | 3 |
| **Civil Engineering 470**<br>Aerial Photogrammetry | (2-3) | 3 |
| **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineering 486**<br>Design of Prestressed Concrete Structures | (2-3) | 3 |
| **Structural Mechanics 469**<br>Analysis of Structures | (2-3) | 3 |

NOTE: By proper choice of technical electives, civil engineering students may specialize to some extent in highway, hydraulic, structural, construction, or sanitary engineering.

## Curriculum in
## ELECTRICAL ENGINEERING

The curriculum in electrical engineering is designed to give the student thorough training in the principles on which electrical phenomena are based. Instruction is provided in the basic sciences and mathematics that serve as the foundation for an engineering career.

The program for the first two years includes mathematics, physics, chemistry, and electrical science together with courses in English, history, economics, and other social and humanistic studies. The third year is devoted largely to the engineering sciences that are appropriate to all fields of electrical engineering. The program in the fourth year consists of studies of a professional nature illustrating the applications of engineering principles to typical problems in the fields of electronics, machinery, and communications. Elective courses in the fourth year permit the student to develop his interest in some particular field of electrical engineering.

Electrical engineering offers many opportunities to young men with suitable training. Graduates presently find employment in the aircraft and missile industry, public utilities, the petroleum industry, communications, and with electrical and electronic manufacturers. Electrical engineering education provides the necessary background for research, design and development, operations, management, and sales in the several industries in which electrical engineers work.

Students who expect to enroll in electrical engineering after attending another college should note that there is a six-semester sequence of electrical engineering courses in the curriculum. If the prerequisites are satisfied, transfer students may complete this sequence in two years and one summer session and should plan to transfer at the beginning of the summer session.

Student branches of the Institute of Radio Engineers and the American Institute of Electrical Engineers have been organized on the campus, and membership in one or both of these organizations serves to keep the student informed about current developments in the field of electrical engineering.

**For classes entering in September 1962 and thereafter**

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Electrical Engineering 201**<br>Electricity and Magnetism | (3-4) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Electrical Engineering 214**<br>Electrical Circuit Theory | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

NOTE: Transfer students who have completed 68 acceptable credits of college work and lack no more than 14 credits of courses required in the sophomore year may attend both summer terms (12 weeks) and arrange a schedule to complete the degree program in four additional semesters. Such students should confer with the departmental advisor before enrolling in the summer session.

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **English 231**[1]<br>Survey of English Literature | (3-0) | 3 | **Electrical Engineering 330**<br>Electrical Machinery | (3-0) | 3 |
| **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 | **English 232**[1]<br>Survey of English Literature | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Electrical Engineering 439**<br>Electronic Systems | (3-0) | 3 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Technical Elective** | | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Elective**[3] | | 3 |
| **Technical Elective** | | 3 | | | 17 |
| | | 17 | | | |

## For classes graduating in 1963-64 and 1964-65

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 |
| **English 231**[1]<br>Survey of English Literature | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **Electrical Engineering 330**<br>Electrical Machinery | (3-0) | 3 |
| **English 232**[1]<br>Survey of English Literature | (3-0) | 3 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 439**<br>Electronic Systems | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 15 |

| | | |
|---|---|---|
| **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Technical Elective** | | 3 |
| **Elective**[3] | | 3 |
| | | 16 |

NOTES: 1. Any courses in English or American literature may be substituted for English 231 and 232.

2. Mathematics 405, 411, 414, 415, or 417 may be substituted for Mathematics 409.

3. Any junior or senior course from Group I, Humanities and Social Electives, page 218, may be chosen.

## Technical Electives for ELECTRICAL ENGINEERING

| | | |
|---|---|---|
| **Electrical Engineering 451**<br>Applied Electromagnetic Theory | (3-0) | 3 |
| **Electrical Engineering 452**<br>Ultra High Frequency Techniques | (2-3) | 3 |
| **Electrical Engineering 454**<br>Advanced Electronic Circuits | (3-3) | 4 |
| **Electrical Engineering 456**<br>Communication Theory | (3-0) | 3 |
| **Electrical Engineering 457**<br>Principles of Electronic Computers | (3-3) | 4 |
| **Electrical Engineering 459**<br>Electric Power Systems I | (2-2) | 3 |
| **Electrical Engineering 460**<br>Electric Power Systems II | (2-2) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |

## Curriculum in GEOLOGICAL ENGINEERING

The curriculum in geological engineering provides training in the fundamental principles of engineering as well as specialized training in geology in a normal period of four years. Although this course is designed primarily for the student who expects to be employed as a petroleum geologist, the curriculum is such that the graduate is also qualified for work with railroads, public utilities, construction, ceramics, and other industries in which a knowledge of both geology and engineering is desirable.

Students interested in construction engineering and soil mechanics should consider obtaining a Bachelor of Science degree in Geological Engineering and a Bachelor of Science degree in Civil Engineering. Copies of a degree plan to satisfy requirements for both degrees may be obtained from the Civil Engineering or the Geology Department.

In addition to the above degree programs, five-year combination degree curricula may be arranged, such as geological engineering—general business, geological engineering—petroleum engineering, or geological engineering—English for a student desiring a broader educational background.

**For classes entering in September 1962 and thereafter**

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 226**<br>Chemical Calculations | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Technical Elective[1, 5]** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Geology 317**<br>Stratigraphic Paleontology | (0-3) | 1 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6[2]

## SENIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | |
| Or | | |
| **Mathematics 417[5]**<br>Numerical Analysis | (3-3) | 4 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Geology (elective[3])** | | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Geology 427**<br>Stratigraphy | (3-0) | 3 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geology or Geophysics (elective[4])** | | 6 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

NOTES:

1. Technical electives are to be selected from Civil Engineering 465; Mathematics 308; Petroleum Engineering 305, 307.
2. Geology 399 may be taken during the second term of the summer session and substituted for any two of the following courses: Geology 303, 304, 406, 423, 425, and 431.
3. This geology elective may be satisfied by Geology 303, 404, 406, or 431.
4. These electives may be satisfied by Geology 304, 423, 425; Geophysics 436, 446.
5. Students desiring training in programming and operating computers should take Mathematics 308 and 417 and Industrial Engineering 458.

### For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 220**<br>Engineering Mechanics | (4-0) | 4 |
| **Petroleum Engineering 305***<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307***<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | | |
|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **Geology (one of the following)** | | | 3 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | | 3 |
| | | | 17 |

| | | | |
|---|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | | 4 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology-Geophysics**<br>**(two of the following**)** | | | 6 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 | |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Geology 433****<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Elective (Humanities)** | | | 3 |
| | | | 17 |

## Curriculum in GEOLOGY

Training in geology is designed to prepare the student in the fundamentals of the earth sciences. These include the study of rocks, minerals, fossils, earth structures, the physical features of the earth's surface, and the economic application of this knowledge.

This curriculum is designed for the student who approaches geology as a science, with the inherent obligation of exploring, observing, analyzing, inquiring, classifying, describing, and finally interpreting the record and the content of the rocks. It is based upon the related sciences of chemistry, physics, mathematics, and biology. It prepares a man either for general geological investigations or for graduate study in geology in a normal period of four years.

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*Civil Engineering 465 may be substituted for Petroleum Engineering 305 and 307.

**Geology 399, 6 hours, may be substituted for Geology 433, 2 hours; any one of Geology 304, 409, 423, or 425, 3 hours; and 1 hour elective.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| | | 16 |

| | | |
|---|---|---|
| **English 319**<br>Report Writing | (1-0) | 1 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 |
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| | | 17 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6

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*May be used as an elective.

## SENIOR YEAR

| First Semester | Th Pr | | Cr |
|---|---|---|---|
| **Geology (three of the following)** | | | 9 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 437**<br>Cenozoic Micropaleontology | (1-6) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Elective** | | | 3 |
| | | | 17 |

| Second Semester | Th Pr | | Cr |
|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Geology-Geophysics (any two)*** | | | 6 |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Elective** | | | 3 |
| | | | 16 |

## Curriculum in
## GEOPHYSICS

### For classes entering in September 1962 and thereafter

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 226**<br>Chemical Calculations | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Physics 301**<br>Heat | (3-0) | 3 |
| | | 15 |

| | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | |
| **Or** | | |
| **Physics 302**<br>Mechanical Properties of Matter | (3-0) | 3 |
| | | 16 |

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*Three credit hours of Geology 399 may be substituted for Geology 409, 423, or 425.

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 | **Technical Elective** | | 3 |
| **Technical Elective** | | 3 | **Elective (Humanities)*** | | 6 |
| **Elective (Humanities)*** | | 3 | | | 16 |
| | | 16 | | | |

## For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| | | 16 | | | 16 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 | **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Elective** | | 5 | **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| | | 17 | **Physics 418**<br>Theoretical Physics | (3-0) | 3 |
| | | | **Elective** | | 3 |
| | | | | | 17 |

## Technical Electives for GEOPHYSICS

By choice of technical electives, a student may gain proficiency in different fields, such as advanced physics, geology, mathematics, or programming of digital computers. Electives may be selected from the following courses:

Electrical Engineering 308
Geology 315, 404, 406, 425, 427
Industrial Engineering 458
Mathematics 409, 410, 414, 417
Physics 311, 405, 416

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*French, German, or Russian is recommended (two semesters of same language).

## Curriculum in
## INDUSTRIAL DISTRIBUTION

Industrial distribution prepares men for industrial technical sales. This program offers preparation in the methods of producing and distributing industrial products. It also provides an understanding of the personnel and human relations problems associated with the distribution of the products of our vast industrial and manufacturing system.

The program is oriented toward industrial and technical courses because the graduate will be selling industrial tools, equipment, and supplies to industrial centers and contractors. His relationships will be with executives, management, engineers, scientists, and craftsmen.

This is one of the few industrial distribution programs offered in the United States. Graduates of this four-year program receive the Bachelor of Science degree in Industrial Distribution.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | (2-3) | 3 |
| **Business Administration 321**<br>Marketing | (3-0) | 3 |
| **Industrial Education 308**<br>A Study of Modern Industries | (3-0) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Elective** | | 4 |
| | | 19 |

| | | |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Business Administration 318**<br>Wholesale Merchandising | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| **Elective** | | 1 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 429**<br>Foremanship and Supervision | (3-0) | 3 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## ELECTIVES FOR INDUSTRIAL DISTRIBUTION

Electives for industrial distribution, industrial education, and industrial technology are to be selected from the general engineering electives shown on page 218 or from the following:

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Civil Engineering 300**<br>Summer Surveying Practice | | 5 |
| **Education 426**<br>Tests and Measurements | (3-0) | 3 |
| **Engineering Graphics 221**<br>Building Construction Drawing | (1-3) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Industrial Education 427**<br>Driver Education | (1-6) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Psychology 305**<br>Personality Adjustments | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Sociology 304**<br>Criminology and<br>Juvenile Delinquency | (3-0) | 3 |
| **Sociology 315**<br>The Family | (3-0) | 3 |
| **Sociology 408**<br>Organization for Boy Scout Work | (2-0) | 2 |

## Curriculum in
## INDUSTRIAL EDUCATION

### Industrial Arts Teacher Education Option

This curriculum prepares men to teach Industrial Arts in the junior and senior high schools, technical schools, and colleges.

Industrial arts includes such content areas as general shop, woodwork, metals, drafting, electricity, plastics, ceramics, leather, and other craft courses. The program of industrial arts teacher education provides excellent technical and professional background in the most modern laboratories and classrooms.

Students completing this four-year program receive the Bachelor of Science degree in Industrial Education and are qualified to apply for the appropriate teaching certificate from the Texas Education Agency.

Teacher education students may also qualify for a certificate to teach driver education in junior and senior high schools and in colleges and private agencies by taking six semester hours of specified and approved courses under a program approved by the American Automobile Association and the Texas Education Agency.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **Engineering Graphics 128**<br>Methods of Industrial Reproduction | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Industrial Education 205**<br>Ornamental Iron | (1-5) | 3 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **Engineering Graphics 221**<br>Building Construction Drawing | (1-3) | 2 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 106**<br>Cabinet Making | (1-6) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Industrial Education 323**<br>Methods of Teaching Mechanical Drawing | (1-3) | 2 |
| **Industrial Education 327**<br>Industrial Arts Handcraft | (1-5) | 3 |
| **Industrial Education 334**<br>Upholstery | (1-3) | 2 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Government 207**<br>State and Local Government | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 310**<br>Course Making | (2-0) | 2 |
| **Industrial Education 332**<br>Plastics and Ceramics | (1-3) | 2 |
| **Industrial Education 336**<br>Design in the Arts and Crafts | (1-3) | 2 |
| **Mechanical Engineering 329**<br>Advanced Cabinet Making | (1-6) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 301**<br>Methods of Teaching and Class Management | (3-0) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Education 404**<br>Visual Aids for Industrial Subjects | (1-2) | 2 |
| **Industrial Education 406**<br>Industrial Guidance | (2-0) | 2 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 |
| **Industrial Education 419**<br>Laboratory of Industries Methods | (1-3) | 2 |
| **Industrial Education 442**<br>Supervised Teaching in Industrial Arts | (2-12) | 6 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Elective** | | 5 |
| | | 17 |

### Vocational Industrial Teacher Education Option

This program is designed for teachers, supervisors, directors, and consultants of vocational educational schools and classes of Texas. Students satisfying the requirements under this program may qualify as teachers under the State Plan for Vocational Education as specified by the Texas Education Agency.

The applicant for this program must have had at least one full year of employed experience at some skilled trade or industrial technical occupation. The student who desires to graduate under this program must submit a written request accompanied by a statement of his employed practical experience. Upon the approval of the request by the Head of the Department and the Dean of Engineering, the student will be permitted to plan a program within the limit of the courses listed here.

Approved industrial experience may be evaluated in terms of college credits and, if acceptable to the Head of the Department and to the Dean of the School of Engineering, may be used in the place of shop work on the basis of four credit hours for each year of industrial experience up to a maximum of twenty credits. Approved teaching experience may be credited as supervised teaching on the basis of two credit hours per year up to a maximum of six credits.

Graduates of this program will receive the Bachelor of Science degree in Industrial Education and may qualify for the appropriate teaching certificate as approved by the Texas Education Agency.

## REQUIRED COURSES

| GENERAL EDUCATION | | | Minimum Credits |
|---|---|---|---|
| **Economics** | | | 6 |
| Economics 203<br>Principles of Economics | (3-0) | 3 | |
| Economics (elective) | | 3 | |
| **English** | | | 10 |
| English 103<br>Composition and Rhetoric | (3-0) | 3 | |
| English 104<br>Composition and Rhetoric | (3-0) | 3 | |
| English 203<br>Introduction to Literature | (2-0) | 2 | |
| English 210<br>Introduction to Logical Discourse | (2-0) | 2 | |
| **Government** | | | 6 |
| Government 206<br>American National Government | (3-0) | 3 | |
| Government 207<br>State and Local Government | (3-0) | 3 | |
| **History** | | | 6 |
| History 105<br>History of the United States | (3-0) | 3 | |
| History 106<br>History of the United States | (3-0) | 3 | |
| **Mathematics** | | | 6 |
| Mathematics 102<br>Algebra | (3-0) | 3 | |
| Mathematics 103<br>Plane Trigonometry | (3-0) | 3 | |
| **Public Speaking** | | | 1 |
| English 401<br>Public Speaking | (0-2) | 1 | |
| **Sociology** | | | 3 |
| Sociology (elective)<br>(Sociology 315 not acceptable) | | 3 | |

## TECHNICAL

| | | | |
|---|---|---|---|
| **Engineering Drawing** | | | 4 |
| Engineering Graphics 105<br>Engineering Graphics | (0-6) | 2 | |
| Engineering Graphics 106<br>Descriptive Geometry | (0-6) | 2 | |
| **Engineering Problems** | | | 1 |
| Mechanical Engineering 101<br>Engineering Problems | (0-3) | 1 | |
| **Shop Work** | | | 24 |
| Includes credit for industrial work experience | | | |

## SCIENCE

| | | | |
|---|---|---|---|
| **Chemistry** | | | 4 |
| Chemistry 106<br>General Chemistry | (3-3) | 4 | |
| **Industrial Supervision or Management** | | | 3 |
| Industrial Education 429<br>Foremanship and Supervision | (3-0) | 3 | |
| **Or** | | | |
| Industrial Engineering 401<br>Survey of Industrial Engineering | (3-0) | 3 | |
| **Modern Industries** | | | 3 |
| Industrial Education 308<br>A Study of Modern Industries | (3-0) | 3 | |
| **Physics** | | | 8 |
| Physics 201<br>College Physics | (3-3) | 4 | |
| Physics 202<br>College Physics | (3-3) | 4 | |

## MILITARY TRAINING

| | | | |
|---|---|---|---|
| **Military or Air Science** | | | 4 |

## PROFESSIONAL EDUCATION

The courses listed below are the basic ones required by the Vocational Division of the Texas Education Agency for a vocational certificate.

| | | | |
|---|---|---|---|
| **General Requirements** | | | 9 |
| Industrial Education 204<br>Development and Practice in Industrial Education | (3-0) | 3 | |
| Industrial Education 301<br>Methods of Teaching and Class Management | (2-0) | 2 | |
| Industrial Education 310<br>Course Making | (2-0) | 2 | |
| Industrial Education 424<br>Organization of Instructional Material | (1-2) | 2 | |
| Additional courses and related fields are listed below depending upon the certificate desired. | | | |
| **For Vocational Industrial Shop Teachers** | | 6 | |
| Visual Aids for Industrial Subjects<br>Methods of Introducing Industrial Organization and Management into Industrial Schools | | | |
| **Or** | | | 6 |
| **For Part-Time Cooperative Training Coordinators** | | 6 | |
| Follow-up, Visitation, and Coordination in Part-Time Schools | | | |
| Related subjects in part-time cooperative programs | | | |
| **Supervised Teaching** | | | 6 |
| **Other general education courses suited to the needs of the student** | | | 8 |

## ELECTIVE

| | | | |
|---|---|---|---|
| **To be approved by the Head of the Department** | | | 27 |
| | **TOTAL CREDITS** | | 145 |

## ELECTIVES

(Same as for Industrial Distribution, see page 204.)

## Curriculum in INDUSTRIAL ENGINEERING

Industrial engineering is the science of production. Just as the other branches of engineering use the laws of the physical sciences in the design and operation of a product, so does industrial engineering apply these same laws to the design, selection, and operation of the plant in which this product is produced. A major distinction between industrial engineering and other branches is that the industrial engineer must consider not only the behavior of inanimate objects as they are governed by physical laws, but also must include in his plan the behavior of people as they operate together in organizations, whether these organizations be simple or complex.

Although usually the industrial engineer is concerned with the production of a manufactured article, the same principles of scientific analysis, planning, and control which are effective in this field have been found to be quite useful in any activity where a large number of people work together. Thus, industrial engineers find employment in wholesale trade, in transportation, even in banks and insurance companies. Because of the increasing technical complexity of today's manufacturing operations, there is a rapidly increasing demand for the graduate who plans to make his career that of production control and supervision. Many industrial engineers now work in automation and electronic data processing.

### Four-Year Curriculum

The four-year curriculum leading to the Bachelor of Science degree in Industrial Engineering fills the above need by providing training in the basic engineering subjects of mathematics, physics, drawing, chemistry, and mechanics which are common to most engineering curricula. Beyond this, it gives students training in manufacturing processes, setting time standards, production control, quality control, tool engineering, cost analysis, factory design, industrial relations, programming of digital computers, and operations research. This combination well equips the graduate to enter the profession of industrial engineering or production management.

### Five-Year Curriculum

Since there is an insistent and growing demand for men versed in the fundamentals of other branches of engineering and also in the principles of executive control, there are offered five-year curricula designed for students who wish training in industrial and in aerospace, chemical, civil, electrical, mechanical, or petroleum engineering. Thus, in five years the student may complete the requirements for two Bachelor of Science degrees, one in his preferred specialty of engineering and the other in the field of industrial engineering. The completion of the requirements for these two degrees admirably prepares the engineering graduate for rapid advancement.

Students desiring to work toward the two degrees should consult with the Director of Admissions and Registrar or the Head of the Industrial Engineering Department for the course requirements. The industrial engineering courses may be taken either concurrently with courses in any of the above branches, which will enable the students to get both degrees at the same time, or may be taken after the first degree is granted. Ordinarily two semesters of additional work are sufficient to complete the requirements for the second degree in industrial engineering.

### For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Mathematics (elective*)** | | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 18 |
| | | 18 | | | |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
| | | 17 | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| | | | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 | **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 453**<br>Tool Engineering | (2-3) | 3 | **Industrial Engineering 485**<br>Special Problems in Industrial Engineering | | 2 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 | **Technical Elective** | | 3 |
| **Technical Elective** | | 2 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
| | | 17 | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| | | | | | 17 |

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*To be selected from Mathematics 308, 414, or 417.

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 |
| **Industrial Engineering 453**<br>Tool Engineering | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Technical Elective** | | 2 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | |
| **Or** | | 3 or 4 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 16 or 17 |

## Technical Electives for
## INDUSTRIAL ENGINEERING

The student should observe that these electives may be used for obtaining a better background in statistics, accounting, or economics. Some technical subjects are available for those so inclined.

| Course | Th Pr | Cr |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 337**<br>Data Processing | (2-2) | 3 |
| **Business Administration 341**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **Economics 437**<br>Government and Labor Relations | (2-0) | 2 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Engineering Graphics 209**<br>Nomography | (2-0) | 2 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Industrial Engineering 485**<br>Special Problems in Industrial Engineering | | 1 to 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Journalism 406**<br>Publicity and Public Relations | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mathematics 411**<br>Mathematical Probability | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| ***Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Statistics 406**<br>Statistical Methods | (2-2) | 3 |

## Curriculum in
## INDUSTRIAL TECHNOLOGY

Industrial technology prepares men for industrial positions in industrial relations, safety (industrial accident prevention), supervision, production, and employee training. Careers in safety are generally available with casualty insurance companies as well as with many of the larger industries. Among the positions in safety are inspectors, specialists, coordinators, directors, and industrial accident prevention consultants.

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*May be used in lieu of Mechanical Engineering 337 and 2 hours of technical elective.

The industrial technologist assists with technical details; uses tools and instruments; fabricates, operates and maintains; tests and performs scientific and technical operations; and reports on and carries out prescribed action. Interests and abilities determine the direction of specialization within this field. The graduate is awarded the Bachelor of Science degree in Industrial Technology.

## FRESHMAN AND SOPHOMORE YEARS

(Same as for Industrial Distribution, see page 203.)

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | (2-3) | 3 |
| **Industrial Education 308**<br>A Study of Modern Industries | (3-0) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Elective** | | 7 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Elective** | | 1 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 423**<br>Analysis Procedure | (1-2) | 2 |
| **Industrial Education 429**<br>Foremanship and Supervision | (3-0) | 3 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Industrial Education 438**<br>Industrial Safety | (2-3) | 3 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

## ELECTIVES

(Same as for Industrial Distribution, see page 204.)

## Curriculum in
## MECHANICAL ENGINEERING

The breadth of the field of mechanical engineering is such that extensive specialization in undergraduate work is impossible and undesirable. Industry needs mechanical engineers for such a variety of work that it is deemed wise to make the curriculum broad and fundamental.

Training in habits of accurate analysis and logical thinking, the prerequisites of a good engineer, is emphasized.

Fundamental theory courses are supplemented by laboratory work in pattern making, foundry, machining, welding, and experimentation. Laboratory courses are designed to instruct in methods rather than to develop extensive skills.

Some specialization is possible in that during the senior year the student may elect courses in such fields as air conditioning, automotive engineering, internal combustion engines, turbines, marine engineering, and data processing.

The work of professional mechanical engineers varies from general engineering to highly specialized fields. It logically falls under **design, construction and erection, operation and maintenance, research, administration,** and **sales.**

**Design engineers** may find their work to be that of original design of machines and associated equipment; design of operating assemblies of machines and equipment commercially available for desired manufacturing, or process jobs; redesign of existing equipment to make possible changes, to improve economy, safety, and appearance.

**Construction and erection engineers** may be responsible for assembling and fabricating entire plants and putting them into operation. They must be able to use engineering drawings, plans and specifications, and to do supplementary design work.

**Operation and maintenance engineers** are in charge of plant performance and upkeep. They must be capable of securing profitable operation and of the supervision of plant personnel.

**Research engineers** are called on for an endless variety of investigations. They must have inquiring minds, initiative, patience, thorough knowledge of the fields in which they work, and the ability to analyze and correlate the results obtained. For the research man, graduate study is recommended.

Many engineers who have the leadership ability, personality, tact, and initiative become **administrators** and **executives.**

**Sales engineers** are probably as much in demand as any other group.

Among the industries that employ a large number of mechanical engineers are: air conditioning, aircraft, aerospace, automotive, chemical, power, petroleum, refrigeration, and general manufacturing.

### For classes entering in September 1962 and thereafter

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Government 206**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
|  |  | 18 |  |  | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 16 |

## For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | 4 |
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| | | 17 |

## Technical Electives for
## MECHANICAL ENGINEERING

| | | |
|---|---|---|
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Mechanical Engineering 409**<br>Structure and Properties of Alloys | (2-3) | 3 |
| **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| **Mechanical Engineering 414**<br>Steam and Gas Turbines | (3-0) | 3 |
| **Mechanical Engineering 420**<br>Marine Engineering | (3-0) | 3 |
| **Mechanical Engineering 432**<br>Automotive Engineering | (3-0) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Mechanical Engineering 485**<br>Advanced Problems in Mechanical Engineering | | 2 to 5 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |

## Curricula in
## PETROLEUM ENGINEERING

The curricula in petroleum engineering are intended to prepare students for the petroleum industry and particularly for those branches which have to do with drilling, production, and transportation of petroleum as well as with the natural gas industry.

Two programs in petroleum engineering are available to the students in this department, a regular four-year curriculum in petroleum engineering leading to the degree of Bachelor of Science and a five-year curriculum in petroleum engineering leading to the degree of Bachelor of Petroleum Engineering.

In addition to these specific degree programs, five year combination degree curricula may be arranged, such as petroleum engineering—chemical engineering, petroleum engineering—geological engineering, petroleum engineering—mechanical engineering, or petroleum engineering—English for one desiring a broader educational background. Those desiring the five-year combination degree curricula in petroleum engineering and another field should contact the Head of the Petroleum Engineering Department for assistance in planning the course of study.

### Four-Year Curriculum

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

The four-year curriculum in petroleum engineering includes sufficient training in civil, mechanical, and electrical engineering to prepare the graduate for the application of engineering principles to the petroleum industry. Courses in geology give an understanding of the geological structures and conditions favorable for petroleum deposits. To the basic subjects are added courses in petroleum engineering which illustrate the application of engineering principles to the type of problems met in the petroleum industry and which also give some understanding of the technique of the industry. Emphasis is placed on thorough grounding in the fundamentals rather than on application to particular problems.

**For classes entering in September 1962 and thereafter**

### FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 6 |
| | | 17 |

### For classes graduating in 1963-64 and 1964-65

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 6 |
| | | 17 |

## Five-Year Curriculum

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

The five-year curriculum in petroleum engineering is designed to provide a broader educational background. This curriculum contains all the courses included in the four-year curriculum and courses in psychology, accounting, English, economics, business, geography, and advanced mathematics.

### For classes entering in September 1962 and thereafter

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| | Th Pr | Cr |
|---|---|---|
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 17 |

| | Th Pr | Cr |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 320**<br>Selected Reading | (1-0) | 1 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective (Humanities)** | | 4 |
| | | 17 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Technical Elective*** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

### For classes graduating in 1963-64, 1964-65, and 1965-66

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-3) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 211**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 320**<br>Selected Reading | (1-0) | 1 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective (Humanities)** | | 4 |
| | | 17 |

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*To be chosen from Petroleum Engineering 416, 419, or 481.

## FIFTH YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## Electives in
## ENGINEERING**

Students with the proper prerequisites may choose their general electives from the list below. Other courses are available to the student upon recommendation of department heads and the approval of the Dean of Engineering.

### I. Humanities—Social Science

1. Architecture 339, 340, 439, 440; English 212, 231, 232, 315, 316, 321, 322, 327, 328, 334, 336, 340, 350, 371, 375; Geography 204, 312, 401; Liberal Arts 201, 301, 304; Psychology 207, 301, 303, 305, 401, 403; Sociology 205, 206, 311, 314, 315, 320, 412, 418.
2. Economics: Any course offered by the Department.
3. History and Government: Any sophomore, junior, or senior course offered by the Department.
4. Modern Languages: Any course offered by the Department.
5. Religious Education: Any course, but not more than 4 semester hours may be counted.

### II. Others

1. Civil Engineering 406, 408, 435, 448, 457, 473; Electrical Engineering 331, 457; Engineering Graphics 221; English 301, 309; Geology 201 or 205; Health Education 216; Industrial Education 328, 429; Industrial Engineering 401, 412, 414, 458; Journalism 304, 311, 315, 321, 406; Oceanography 401; Physical Education 210, 221.
2. Air Science: Any junior or senior course offered by the Department.
3. Biology: Any course, but not more than 7 hours of freshman courses.
4. Business Administration: Any sophomore, junior, or senior course offered by the Division.
5. Chemistry: Any sophomore, junior, or senior course offered by the Department.
6. Mathematics: Any junior or senior course offered by the Department.
7. Military Science: Any junior or senior course offered by the Department.
8. Nuclear Engineering: Any course offered by the Department.
9. Physics: Any junior or senior course offered by the Department.

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*To be chosen from Petroleum Engineering 416, 419, or 481.

**Certain courses from the above list are acceptable to the Air Science and the Military Science Departments in partial fulfillment of the ROTC requirements.

# THE SCHOOL OF MILITARY SCIENCES

The participation of our government in foreign affairs makes it apparent that every young American must recognize his obligation for service to his country and should realize the necessity for coordination of his military and civilian careers. The Army and Air Force at the Agricultural and Mechanical College of Texas offer ROTC courses which supplement the student's civilian curriculum and offer him the opportunity of planning his civilian and military careers on a mutually supporting basis.

In the words of General Eisenhower, "ROTC is a ready-made course, designed and perfected to develop the qualities of leadership required in both military and civil enterprise."

## AIR SCIENCE

The Air Force ROTC program is designed to develop qualities of leadership, character, and citizenship, and to prepare selected college students to be commissioned officers in the United States Air Force. The first Air Force (then Air Service) ROTC units were established in 1920 at the Universities of California and Illinois, at Massachusetts Institute of Technology, and at the Agricultural and Mechanical College of Texas. Today the program includes over 100,000 students at approximately 187 colleges and universities.

The Air Force ROTC program, called Air Science, is divided into two parts. The first two years constitute the basic course and the second two years constitute the advanced course. Successful completion of the advanced course is a prerequisite for commissioning. The basic course acquaints students with the concepts of aerospace power and prepares them for the advanced course. However, since not all cadets qualify for entry into the advanced course, the emphasis in the basic course is on aerospace age citizenship and is intended to help all young men face the challenges of the aerospace age. Cadets enrolled in the basic course are deferred from draft by Selective Service. Enrollment in the basic course is limited to students who are citizens of the United States, not less than 14 years of age, physically qualified for military service, loyal to the United States, and of good moral character. Upon request, the Professor of Air Science may permit a student who does not meet these criteria to pursue the course for academic credit only or to satisfy the College requirement for military training, but the student must purchase the required uniform at his own expense.

Cadets in the first year of the basic course attend class one hour a week and participate in leadership laboratory one hour a week. The first-year curriculum is designed to acquaint the cadet with the foundations of aerospace power; the fundamentals of aerospace science; the mission, organization, and operation of the USAF; and the Air Force as a professional career. Cadets in the second year of the basic course attend class two hours a week and leadership laboratory one hour a week. The second year consists of a survey of the development of aerospace warfare with emphasis on the principles of war, concepts of employment of aerospace forces, weapon systems development, and the problems and possibilities of operating in space. Professional opportunities in the USAF are also covered.

Leadership training is continuous during the student's life as an Air Force ROTC cadet. Classroom instruction and the leadership laboratory are both designed to develop to the maximum each cadet's leadership potential and his knowledge of military fundamentals. Instruction in military courtesy and discipline will be of value in any walk of life. The common courtesies, respect for authority, and intelligent leadership demanded by the Air Force are the same qualities needed for success in civilian life. In this program the cadet has an opportunity to apply principles of leadership, management, and staff work in actual situations.

Cadets apply for enrollment in the advanced course during their second year of basic air science. They take the Air Force Officer Qualification Test and those who qualify are given a physical examination. Enrollment in the advanced course is carefully limited to students of high moral character who are physically qualified, who possess the necessary interest, intelligence, and aptitude, who have demonstrated leadership potential, and who are well qualified academically. For enrollment in the advanced course, the cadet must have proven himself diligent and successful in his regular studies and not just in his air science courses. Academic excellence is strongly encouraged. The purpose of this program is to supplement the student's regular academic work with a program of education and training that will prepare him to accept and discharge the responsibilities of leadership that are inherent in commissioned officer positions. Graduation and a degree are prerequisites to a commission. An advanced course cadet is a member of a select group.

The first year of the advanced course is a study of the principles of leadership and management as they apply to Air Force problems and tasks. Included are Air Force leadership doctrine, major socio-psychological principles of leadership, a consideration of the leader-follower relationship in an Air Force environment, and communication theory relevant to leadership. During the summer between the first and second years of the advanced course, the cadet attends a four-week summer camp on an Air Force base. Here during a period of intense training under close supervision, he sees the Air Force in operation and becomes familiar with its equipment, procedures, and systems. The second year of the advanced course is a study of global relationship of special concern to the Air Force officer with attention to such aspects as weather, navigation, world political geography, and international relations. With the approval of the Air Force and the College, certain college courses have been substituted for Air Science courses with similar objectives. These courses are: English 210, Introduction to Logical Discourse; English 401 (or 403), Public Speaking; History 318, International Developments since 1918; and Geography 401, International Political Geography. As a result, the advanced course Air Force ROTC student now has more time available to further his study in his academic major.

During his senior year, a cadet who has applied for Air Force pilot training after graduation is given 36½ hours of flight training in light aircraft and 35 hours of ground school. Flight training is provided at the College by an FAA approved flying school operator, and upon successful completion, the student is eligible for a private pilot's license.

If a student is selected for enrollment in the advanced course, he must agree to complete the advanced course, complete the Summer Training Unit during the summer between his junior and senior years, and, upon graduation, accept a commission as an officer in the Air Force Reserve if one is tendered. The foregoing becomes an integral part of his degree requirements from the College. He must also agree to serve on active duty for not less than four years after being commissioned, or, if applying for flight training either as a pilot or as a navigator, must agree to serve on active duty for not less than four years after completion of basic flight training. Advanced course cadets are deferred from draft by Selective Service. They receive uniforms and approximately $500.00 from the Air Force during their two years in the program. This is in addition to their pay and travel allowances received in connection with their attendance at the Summer Training Unit.

Upon completion of the advanced course and graduation from College, students are commissioned as second lieutenants in the United States Air Force Reserve. Distinguished graduates are eligible to receive commissions in the Regular Air Force.

The Air Force ROTC program is administered by the Department of Air Science, which is an integral part of the College. All instructors are active duty officers assigned to the College by the United States Air Force. Details on courses offered are set forth under the departmental listing in this catalogue. Information desired may be obtained by writing directly to the Professor of Air Science.

## MILITARY SCIENCE

While the four-year ROTC course normally leads to a reserve commission, the Army relies upon this source for half of the new Regular Army Officers appointed each year. The Army program is a general military science curriculum, and under the Distinguished Military Graduate program, interested cadets can apply for and be granted regular commissions upon graduation. Those students selected must be outstanding in military aptitude and academic proficiency. They will be tendered the same type of commission given graduates of the United States Military Academy, West Point, New York. Many A. and M. graduates who received their commissions under this program are now actively pursuing Army careers.

Branch assignments for regular and reserve commissions will be made by the Department of the Army. These branch assignments will be based on the curriculum of the student's major field of study, student preference, leadership, and technical qualifications. Students will select three branches in order of preference. If a student is physically qualified for a commission in the combat branches, one of the three branches selected must be a combat arm.

## THE ARMY COMBAT ARMS

The mission of the entire Army is to support the fighting teams on the battle lines—the men who get there first. These teams are made up of Infantry, Armor, Artillery, Engineers, and Signal Corps.

INFANTRY. Post World War II hostilities have illustrated again that the Infantry officer is the key to success in battle. He is the bulwark of Americanism whose steadfastness is the true measure of our national security.

As the lives of our fighting men are more highly valued than the equipment of war, competent leadership is imperative. To meet this need, the U. S. Infantry officer has developed throughout our history to his present status of personnel management specialist in addition to his tactical proficiency. He undergoes a career-long balanced program of training that includes fine service schools and the best civilian colleges as well as service in both command and staff capacities. Full utilization of these opportunities, combined with maximum individual effort, results in a well rounded officer capable of effective performance in this most challenging career field.

No special academic course is necessary for commission in the Infantry.

ARMOR. Armor is the combat arm with characteristics and capabilities especially designed for offensive action. The role of Armor on today's battlefield is the conduct of highly mobile ground warfare, primarily offensive in nature, and characterized by a predominance of mounted combat. Armored units concentrate their firepower at the decisive area of action to lead or accompany Infantry in destroying the enemy. This role is performed by the armored division, armored cavalry regiment, separate armor groups, and the armor elements of infantry and airborne divisions. Officers serving with Armor may anticipate rewarding assignments in these units, which provide valuable experience in working with men, machines, and weapons. Today's modern Armor combines newly acquired mobility, firepower, and shock action with the traditional dash and daring of the old Cavalry to produce a fast, hard-hitting team that truly earns its name as "The Combat Arm of Decision."

ARTILLERY. Artillery is the combat branch which is primarily concerned with the employment and firing of cannon in warfare. Its armament includes many types of guns, howitzers, rockets and guided missiles, all designed to enhance the destructive potential of the army against hostile targets on the ground, in the air, and on the water.

To combat these diversified targets, Artillery is comprised of two general types—Field Artillery and Air Defense Artillery—each type being armed with weapons and equipment commensurate with its combat responsibilities. Many of these weapons deliver an atomic warhead.

With the advent of rockets and guided missiles, an even wider field is being opened for the Artilleryman. Varieties of rockets and guided missiles, such as the Nike and the Redstone, have been developed for the use of the

Artillery in coping with the higher speeds and altitudes of modern aircraft and greater ranges to ground targets. The field is open for employment of electronic equipment which will cause rockets to locate and automatically direct themselves to targets at extremely high altitudes, speeds, and ranges.

No special academic course is required for commission in the Artillery, although a demonstrated aptitude for mathematics is desirable.

THE CORPS OF ENGINEERS. The Corps of Engineers is both a combat arm and a technical service of the Department of the Army. In addition it has a civil mission. This multiple function presents a challenging and varied career for Engineer officers. Engineer military operation is worldwide, embracing most fields of engineering and construction practices in highly diversified geographical and political areas.

The civil works function of the Corps of Engineers is supervised directly by the Congress of the United States and includes river and harbor developments, flood control, canals, dams, and relief work in disaster areas.

To be commissioned in the Corps of Engineers a student must pursue a course which leads to a degree in engineering, technical or other scientific field.

THE SIGNAL CORPS. The Signal Corps is both a combat arm and a technical service of the Department of the Army. As a combat arm, its mission is to provide the communications network for all military operations from Department of the Army Headquarters to the front lines. This service is performed in peace and in war by the most practical and efficient means consistent with modern developments. As a technical service, its mission is to develop, procure, and maintain equipment used for such fields as electronics, avionics, meteorology, photography, and television. This service includes the engineering, installation, operation, and maintenance of fixed Army communications and training of signal specialists. Signal communications are the nerve system of the Army which enables coordination of effort by all branches.

Signal corps requirements for officers exist in the following fields: Communications, Electronics, and Electrical Engineering; Physics, Mathematics, Meteorology; Automatic Data Processing Systems; Operations Research; Business Administration; Personnel Management; Education; Comptrollership; Motion Picture and Television Production.

## THE TECHNICAL SERVICES

THE ARMY INTELLIGENCE AND SECURITY BRANCH. On July 1, 1962, the Intelligence and Security Branch was established as a basic branch of the Army for the purpose of assuring an adequate number of officers highly qualified in intelligence and security fields.

The new branch will operate as a part of the Officer Personnel Directorate, Office of Personnel Operations, on a co-equal basis with the other branches of the Army. One central office will be responsible for procuring, training, and assigning intelligence and security officers. The branch will embrace all officer military occupation specialties concurrently in the Army Security Agency and those in the Intelligence Corps, including counterintelligence, combat, and strategic intelligence.

No special academic course is required for a commission in Army Intelligence and Security Branch, though it is desirable that a majority of the personnel have a technical background in such fields as electronics, mathematics, and allied phases of engineering.

THE CHEMICAL CORPS. The Chemical Corps is charged with the investigation, research, design, and development of chemical, biological, and radiological warfare items. It is concerned with smoke and incendiary materials, toxic gases, all war gas defense appliances, and biological warefare and radiological defense activities. It furnishes advice to all elements of the Department of Defense on chemical and biological warfare and radiological defense. It is responsible for the supervision of training of the army in chemical and biological warfare and radiological defense.

To be commissioned in the Chemical Corps, a student must be pursuing a course which leads to a degree in a scientific or engineering field, with preference for the chemical, biological, and mechanical arts and sciences.

THE ORDNANCE CORPS. The Ordnance Corps provides the Armed Forces of our country with material for firepower and mobility—rifles, machine guns, artillery, ammunition, tanks, and trucks. Ordnance material ranges from time pieces to radar controlled automatic antiaircraft guns; from jeeps to ponderous tank transporters; from pistol cartridges to guided missiles.

Ordnance officers perform work closely related with business and industry. They must be businessmen, but the technical nature of Ordnance Corps activities calls for an engineering or scientific background.

To be commissioned in the Ordnance Corps, a student should pursue a course which leads to a degree in engineering, technical, or other scientific fields. However, degrees in business administration and management are often accepted.

THE QUARTERMASTER CORPS. One of the world's largest business organizations, the Quartermaster Corps supplies over 70,000 items to a million men all over the globe; in time of war this may be expanded to 85,000 items to ten million men.

Quartermaster officers of outstanding executive caliber and of potentially sound business sense design, produce, test, and supply clothing for every climate, food for every mealtime situation, and petroleum products for all purposes. These officers are at once merchants, importers, exporters, warehouse managers, purchasing agents, and expediters.

Although no special academic course is required for a commission in the Quartermaster Corps, business administration, personnel management, food technology, and petroleum engineering are recommended educational fields.

THE TRANSPORTATION CORPS. The Transportation Corps performs transportation functions for the Army and provides such transportation service to the Air Force or Navy as may be directed. Transportation officers are the Army's traffic managers as well as highway and railroad executives. The Corps is a major Army user of large transport-type aircraft, both fixed and rotary wing, in the movement of essential supplies in direct support of combat units. It has over-all responsibility for the research, development, and logistical support of Army Aviation. Constant improvement in the movement of men and supplies throughout the world challenges the initiative, leadership, and ingenuity of transportation officers in command or staff capacities, many of which are closely allied with civilian occupations.

Although no special academic course is required for a commission in the Transportation Corps, business administration, economics, and engineering are recommended educational fields.

## THE ADMINISTRATIVE SERVICES

ADJUTANT GENERAL'S CORPS. The Adjutant General's Corps provides military personnel management, Special Services activities, and administrative service for the Army establishment and for other components of the Department of Defense. The qualified Adjutant General's Corps officer is the Army's expert in administrative and personnel matters and is a key member on the Commander's Staff.

No special academic course is required for a commission in the Adjutant General's Corps although business, commerce, and psychology are recommended educational fields.

FINANCE CORPS. The Finance Corps provides finance services for the Army and other components of the Department of Defense. The activities include paying military personnel, allotments for dependents of service personnel, and paying the salaries of civilian personnel of the Army.

No special academic course is required for a commission in the Finance Corps although business and commerce are recommended educational fields.

MILITARY POLICE CORPS. The primary mission of the Military Police Corps is to assist the commander in maintenance of discipline by enforcement of law and order within the military establishment. Thus military policemen will ordinarily be found directing military traffic, patrolling streets in towns where soldiers frequently congregate; investigating crimes committed against individual soldiers, civilians, or the Army; apprehending deserters and personnel absent without leave; maintaining order aboard trains and ships; and providing security for certain types of military operations and installations.

No special academic course is required for a commission in the Military Police Corps.

# THE SCHOOL OF VETERINARY MEDICINE

## ORGANIZATION

The School of Veterinary Medicine is organized with seven departments. They are Anatomy, Medicine and Surgery, Microbiology, Parasitology, Pathology, Physiology and Pharmacology, and Public Health. Each department is administered by the Head of the Department, who is responsible to the Dean of Veterinary Medicine for all programs assigned or developed in the department, including teaching, research, extension and service.

A Veterinary Hospital and Ambulatory Clinics are operated within the school to provide clinical laboratories for the veterinary training program.

An extensive research program in animal health and disease is carried on by the faculty and staff of the school, and a large portion of the teaching faculty is engaged in research.

A veterinary extension program carries research information to the veterinarians, animal owners, and other people of the state and nation with the least possible delay. The faculty makes research information available to the students in the classroom and laboratories many years before the data can appear in textbook form.

The three-phase program of teaching, research, and extension provides the organization necessary to cope with the dynamics of veterinary medicine in all its implications.

## CURRICULA

### Pre-Veterinary Medicine (pre-professional)

The curriculum in pre-veterinary medicine is designed to provide the student who plans to pursue the professional course of study with a broad and liberal academic training at the pre-professional college level, and, at the same time, prepare the student for the rigorous demands of the technical content of the professional curriculum. In order to accomplish such a dual objective in the two-year period allocated to the pre-veterinary curriculum, the curriculum is an intense one. It includes sound and intensive training in the social and political sciences and humanities, since there is little space in the professional curriculum for these subjects. It is strong in the physical and life sciences, since these are the cornerstones on which the professional curriculum is built. It includes comprehensive acquaintance courses in the field of animal science for those students not having had extensive experience with farm and ranch livestock.

One objective is to initiate social development so that the individual may find pleasure in his environment and make constructive contributions to the society in which he lives. The other objective is to provide the basic foundation on which the individual may build a technical career in the arts and sciences of animal health and disease. Both objectives seek to stimulate the development of the whole man.

### Veterinary Medicine (professional)

The professional curriculum seeks to deliver to the veterinary medical profession a student fully equipped to begin a medical career in the arts and sciences of animal health and disease. Emphasis on professional specialization is reserved for the graduate program.

Veterinary medicine encompasses the full scope of the technology of animal health and disease, including the sciences and arts of disease prevention, diagnosis, prognosis, and therapy. The professional curriculum begins at the basic level and systematically moves to the applied.

Graduates are qualified to formulate and implement programs for diseases and disease prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, experimental laboratory animals, and wild life. They are equipped to administer and advise in the public health problems arising from intertransmission of diseases between man and lower animals. They are prepared for inspection work in milk and meat hygiene and in food processing plants. They are capable of performing animal disease regulatory duties for governmental agencies. They are oriented for professional careers in the armed forces. They are prepared to begin careers in teaching and research in America's colleges and universities.

The degree of Doctor of Veterinary Medicine is awarded to the student upon successful completion of the professional curriculum in veterinary medicine.

The graduate has a wide choice of fields within the veterinary professional framework in which to begin his specialization with full confidence that he has received the training necessary for success.

**Graduate Program (specialization)**
Graduate programs leading to the Master of Science and Doctor of Philosophy degrees are available in the departments of the School of Veterinary Medicine. These programs are designed to give effective training in the areas of professional specialization. The programs are research oriented but sufficiently flexible to permit intensive training in many areas of special student interest.

## PRE-VETERINARY MEDICINE REQUIREMENTS

The minimum scholastic requirement for enrollment in the professional veterinary curriculum is the satisfactory completion of not less than 68 semester hours of acceptable college credit to include the following courses:

Biology—6 hours (to include botany and zoology)
Chemistry—16 hours (including at least 5 hours of organic chemistry)
English—10 hours
*Government—6 hours (American and Texas)
*History—6 hours (American)
Mathematics—6 hours (college algebra and trigonometry)
Physics—8 hours
Electives—10 hours

Elective hours should be taken in the following areas, depending upon the needs of the individual student, and must have the approval of the student's academic dean:

Agronomy
Animal Husbandry
Biology
Dairy Science
Economics
English
Foreign Language
Mathematics
Poultry Science
Psychology
ROTC
Sociology
Statistics

The pre-veterinary curriculum at the A. and M. College of Texas is listed below. Students expecting to qualify for enrollment in the professional curriculum in the minimum time of four semesters should pursue essentially the same pattern of courses. Substitution for any course may be made only with the approval of the Dean of Veterinary Medicine.

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*For the legal requirement in government and history for a degree, see page 103. Any student unable to complete the government requirement in the institution he is attending should consult the Registrar of A. and M. College about the conditions under which the needed course may be obtained by correspondence.

## Curriculum in
## PRE-VETERINARY MEDICINE

### For classes entering in September 1963 and thereafter

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 6 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### For the class that entered in September 1962

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## ADMISSION TO THE PROFESSIONAL CURRICULUM

Admission to the professional curriculum in veterinary medicine is granted only for the beginning of the fall trimester. Formal application must be filed with the Director of Admissions and Registrar between March 1 and May 1 of the calendar year in which admission is sought. Accompanying the application form must be a complete and official transcript from each college or university the applicant has attended, including a record of courses in progress.

## ENROLLMENT POLICIES IN THE PROFESSIONAL CURRICULUM

Enrollment in the first year of the professional veterinary medicine curriculum is limited by facilities of the College to a definite number each year. Selection within this quota is based on scholastic record, professional aptitude, and character considerations. Admission to the pre-veterinary curriculum does not carry assurance that the student will be admitted to the professional curriculum.

Because of limited enrollment in the professional curriculum, priority groups for consideration of applications have been established by states of residence as follows:

1. First consideration is given to qualified applicants who are residents of Texas and states with which Texas has contracts through the Southern Regional Education Board up to the limit of the quota.
2. If the quota is not filled from priority group 1, a second group of qualified applicants from states of the United States which have no school of veterinary medicine will be considered.
3. If the quota is not filled from priority groups 1 and 2, a third group of qualified applicants will be considered from other states of the United States which have schools of veterinary medicine.
4. An exceptionally well qualified student will be considered without regard to residency.

## ADMISSION TO THE THIRD YEAR OF THE PROFESSIONAL VETERINARY CURRICULUM

No student will be permitted to register for the last year of the professional veterinary curriculum until he has completed, with an average grade of C or better, all work prescribed in the first six trimesters of the professional curriculum, and has satisfactorily completed a comprehensive examination covering all work taken during the first six trimesters. The comprehensive examination is given after the close of the third trimester of the second year, is interdepartmental in scope, and may be oral, written, or any combination of these.

## READMISSION

A student in the professional curriculum who voluntarily withdraws from the College, or who is dropped from the rolls of the College or from the professional veterinary curriculum for cause, forfeits his standing and must apply for readmission and be approved before being re-enrolled. A student who fails any course prescribed in the professional curriculum may be dropped from the curriculum for cause.

## TRIMESTER PROGRAM IN VETERINARY MEDICINE

The professional veterinary medicine curriculum at the A. and M. College of Texas will be offered on a trimester basis beginning in September 1964. The trimester system includes three terms of fifteen weeks each during an academic year. The professional veterinary curriculum includes three years, or nine trimesters, of college work.

The first trimester will begin early in September and extend until the beginning of the Christmas recess. The second trimester, beginning early in January, will extend until some date in April. After a spring recess of one week, the third trimester will begin and extend until an early date in August. This plan will permit a summer vacation of four weeks following the close of the third trimester as well as the usual Thanksgiving, Christmas, Easter, and Fourth of July holiday periods.

Students entering the professional veterinary curriculum in September 1961, 1962, and 1963 will have modified semester schedules during the semester program phase-out period. On the pages which follow will be found the curriculum appropriate for each group.

## Curriculum in
## VETERINARY MEDICINE

### For classes entering the professional curriculum in September 1964 and thereafter

### FIRST YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Anatomy 301**<br>Anatomy | (1-9) | 4 |
| **Veterinary Anatomy 303**<br>Histology | (2-6) | 4 |
| **Veterinary Medicine and Surgery 311**<br>History of the Veterinary Profession | (1-0) | 1 |
| | | 18 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Veterinary Anatomy 302**<br>Anatomy | (1-9) | 4 |
| **Veterinary Anatomy 304**<br>Embryology | (3-3) | 4 |
| **Veterinary Microbiology 335**<br>Microbiology | (3-5) | 5 |
| **Veterinary Physiology and Pharmacology 326**<br>Physiology | (3-3) | 4 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 406**<br>Neuroanatomy | (0-6) | 2 |
| **Veterinary Microbiology 436**<br>Microbiology | (3-5) | 5 |
| **Veterinary Parasitology 483**<br>Parasitology | (2-2) | 3 |
| **Veterinary Pathology 443**<br>General Pathology | (4-3) | 5 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (3-3) | 4 |
| | | 19 |

### SECOND YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 412**<br>Radiology | (2-0) | 2 |
| **Veterinary Microbiology 438**<br>Virology and Serology | (2-3) | 3 |
| **Veterinary Parasitology 484**<br>Parasitology | (2-2) | 3 |
| **Veterinary Pathology 444**<br>Special Pathology | (4-3) | 5 |
| **Veterinary Physiology and Pharmacology 429**<br>Endocrinology | (2-3) | 3 |
| **Veterinary Physiology and Pharmacology 430**<br>Pharmacology | (3-3) | 4 |
| | | 20 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 570**<br>General Surgery | (2-3) | 3 |
| **Veterinary Medicine and Surgery 571**<br>Diseases of Small Animals | (5-0) | 5 |
| **Veterinary Medicine and Surgery 572**<br>Clinical Medicine | (0-3) | 1 |
| **Veterinary Pathology 548**<br>Nutritional and Metabolic Diseases | (3-0) | 3 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (3-3) | 4 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (3-2) | 4 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 501**<br>Applied Anatomy | (1-6) | 3 |
| **Veterinary Medicine and Surgery 573**<br>Obstetrics and Reproductive Diseases | (3-3) | 4 |
| **Veterinary Medicine and Surgery 574**<br>Diseases of Large Animals | (5-0) | 5 |
| **Veterinary Medicine and Surgery 575**<br>Operative Surgery | (2-4) | 3 |
| **Veterinary Medicine and Surgery 576**<br>Clinical Medicine | (0-3) | 1 |
| **Veterinary Public Health 590**<br>Food Hygiene | (2-2) | 3 |
| | | 19 |

## THIRD YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 320**<br>Animal Nutrition and Feeding | (3-0) | 3 |
| **Veterinary Clinics 501**<br>Clinics | (0-24) | 8 |
| **Veterinary Medicine and Surgery 577**<br>Diseases of Large Animals | (3-0) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-0) | 2 |
| **Veterinary Pathology 549**<br>Clinical Pathology | (2-0) | 2 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-0) | 2 |
| | | 20 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Veterinary Clinics 502**<br>Clinics | (0-30) | 10 |
| **Veterinary Medicine and Surgery 578**<br>Laboratory and Domestic Animal Health Management | (4-0) | 4 |
| **Veterinary Medicine and Surgery 581**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 594**<br>Principles of Epidemiology | (3-0) | 3 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Clinics 503**<br>Clinics | (0-33) | 11 |
| **Veterinary Medicine and Surgery 579**<br>Practice Management | (2-0) | 2 |
| **Veterinary Medicine and Surgery 582**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 595**<br>Public Health | (2-0) | 2 |
| | | 19 |

**For class entering the professional curriculum in September 1963**

## FIRST YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Anatomy 301**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 303**<br>Histology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 302**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 304**<br>Embryology | (3-3) | 4 |
| **Veterinary Anatomy 306**<br>Neuroanatomy | (0-6) | 2 |
| **Veterinary Microbiology 435**<br>Microbiology | (3-4) | 4 |
| **Veterinary Physiology and Pharmacology 326**<br>Physiology | (3-3) | 4 |
| **Elective** | | 3 |
| | | 20 |

## SUMMER SESSION 1964

| First Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Microbiology 436**<br>Microbiology | (9-9) | 4 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (6-9) | 3 |
| | | 7 |

| Second Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Parasitology 483**<br>Parasitology | (6-6) | 3 |
| **Veterinary Pathology 443**<br>General Pathology | (9-9) | 4 |
| | | 7 |

## SECOND YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 412**<br>Radiology | (2-0) | 2 |
| **Veterinary Microbiology 438**<br>Virology and Serology | (2-3) | 3 |
| **Veterinary Parasitology 484**<br>Parasitology | (2-2) | 3 |
| **Veterinary Pathology 444**<br>Special Pathology | (4-3) | 5 |
| **Veterinary Physiology and Pharmacology 429**<br>Endocrinology | (2-3) | 3 |
| **Veterinary Physiology and Pharmacology 430**<br>Pharmacology | (3-3) | 4 |
| | | 20 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 570**<br>General Surgery | (2-3) | 3 |
| **Veterinary Medicine and Surgery 571**<br>Diseases of Small Animals | (5-0) | 5 |
| **Veterinary Medicine and Surgery 572**<br>Clinical Medicine | (0-3) | 1 |
| **Veterinary Pathology 548**<br>Nutritional and Metabolic Diseases | (3-0) | 3 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (3-3) | 4 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (3-2) | 4 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 501**<br>Applied Anatomy | (1-6) | 3 |
| **Veterinary Medicine and Surgery 573**<br>Obstetrics and Reproductive Diseases | (3-3) | 4 |
| **Veterinary Medicine and Surgery 574**<br>Diseases of Large Animals | (5-0) | 5 |
| **Veterinary Medicine and Surgery 575**<br>Operative Surgery | (2-4) | 3 |
| **Veterinary Medicine and Surgery 576**<br>Clinical Medicine | (0-3) | 1 |
| **Veterinary Public Health 590**<br>Food Hygiene | (2-2) | 3 |
| | | 19 |

## THIRD YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 320**<br>Animal Nutrition and Feeding | (3-0) | 3 |
| **Veterinary Clinics 501**<br>Clinics | (0-24) | 8 |
| **Veterinary Medicine and Surgery 577**<br>Diseases of Large Animals | (3-0) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-0) | 2 |
| **Veterinary Pathology 549**<br>Clinical Pathology | (2-0) | 2 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-0) | 2 |
| | | 20 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Veterinary Clinics 502**<br>Clinics | (0-30) | 10 |
| **Veterinary Medicine and Surgery 578**<br>Laboratory and Domestic Animal Health Management | (4-0) | 4 |
| **Veterinary Medicine and Surgery 581**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 594**<br>Principles of Epidemiology | (3-0) | 3 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Clinics 503**<br>Clinics | (0-33) | 11 |
| **Veterinary Medicine and Surgery 579**<br>Practice Management | (2-0) | 2 |
| **Veterinary Medicine and Surgery 582**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 595**<br>Public Health | (2-0) | 2 |
| | | 19 |

## For class that entered the professional curriculum in September 1962

### SUMMER SESSION 1963

| First Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Microbiology 435**<br>Microbiology and Immunology | (9-12) | 4 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (6-9) | 3 |
| | | 7 |

| Second Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Parasitology 483**<br>Parasites of Domestic Animals | (6-6) | 3 |
| **Veterinary Pathology 443**<br>General Pathology | (9-9) | 4 |
| | | 7 |

### SECOND YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 416**<br>General Surgery | (1-0) | 1 |
| **Veterinary Microbiology 436**<br>Microbiology | (3-3) | 4 |
| **Veterinary Parasitology 484**<br>Parasitology | (2-2) | 3 |
| **Veterinary Pathology 444**<br>Special Pathology | (5-3) | 6 |
| **Veterinary Physiology and Pharmacology 428**<br>Pharmacology | (3-0) | 3 |
| **Veterinary Physiology and Pharmacology 585**<br>Problems in Physiology | (0-3) | 1 |
| **Veterinary Public Health 533**<br>Food Hygiene | (1-2) | 2 |
| | | 20 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 501**<br>Applied Anatomy | (0-6) | 2 |
| **Veterinary Medicine and Surgery 513**<br>Non-Infectious Diseases of Small Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 515**<br>General Surgery | (4-0) | 4 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (2-3) | 3 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (2-2) | 3 |
| **Veterinary Public Health 536**<br>Infectious Diseases of Large Animals | (5-0) | 5 |
| | | 20 |

### SUMMER SESSION 1964

| First Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 514**<br>Infectious Diseases of Small Animals | (6-0) | 2 |
| **Veterinary Medicine and Surgery 519**<br>Clinics | (0-12) | 1 |
| **Veterinary Medicine and Surgery 524**<br>Operative Surgery of Small Animals | (3-6) | 2 |
| **Veterinary Medicine and Surgery 526**<br>Obstetrics | (6-0) | 2 |
| | | 7 |

| Second Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 516**<br>Operative Surgery of Large Animals | (6-6) | 3 |
| **Veterinary Medicine and Surgery 520**<br>Clinical Seminar | (0-12) | 1 |
| **Veterinary Medicine and Surgery 521**<br>Reproductive Diseases | (6-0) | 2 |
| | | 6 |

### THIRD YEAR

| First Trimester | Th Pr | Cr |
|---|---|---|
| **Veterinary Clinics 501**<br>Clinics | (0-24) | 8 |
| **Veterinary Medicine and Surgery 412**<br>Radiology | (2-0) | 2 |
| **Veterinary Medicine and Surgery 577**<br>Diseases of Large Animals | (3-0) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-0) | 2 |
| **Veterinary Pathology 549**<br>Clinical Pathology | (2-0) | 2 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-0) | 2 |
| | | 19 |

| Second Trimester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Veterinary Clinics 502**<br>Clinics | (0-30) | 10 |
| **Veterinary Medicine and Surgery 578**<br>Laboratory and Domestic Animal Health Management | (4-0) | 4 |
| **Veterinary Medicine and Surgery 581**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 594**<br>Principles of Epidemiology | (3-0) | 3 |
| | | 20 |

| Third Trimester | Th Pr | Cr |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Clinics 503**<br>Clinics | (0-33) | 11 |
| **Veterinary Medicine and Surgery 579**<br>Practice Management | (2-0) | 2 |
| **Veterinary Medicine and Surgery 582**<br>Clinical Seminar | (1-0) | 1 |
| **Veterinary Public Health 595**<br>Public Health | (2-0) | 2 |
| | | 19 |

## For class that entered the professional curriculum in September 1961

### SUMMER SESSION 1963

| First Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 511**<br>Non-Infectious Diseases of Large Animals | (9-0) | 3 |
| **Veterinary Medicine and Surgery 515**<br>General Surgery | (12-0) | 4 |
| **Veterinary Medicine and Surgery 519**<br>Clinics | (0-12) | 1 |
| | | 8 |

| Second Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 520**<br>Clinical Seminar | (0-12) | 1 |
| **Veterinary Medicine and Surgery 526**<br>Obstetrics | (6-0) | 2 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (6-9) | 3 |
| **Veterinary Public Health 533**<br>Food Hygiene | (3-6) | 2 |
| | | 8 |

### THIRD YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Veterinary Anatomy 501**<br>Applied Anatomy | (0-6) | 2 |
| **Veterinary Medicine and Surgery 513**<br>Non-Infectious Diseases of Small Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 514**<br>Infectious Diseases of Small Animals | (2-0) | 2 |
| **Veterinary Medicine and Surgery 516**<br>Operative Surgery of Large Animals | (2-2) | 3 |
| **Veterinary Medicine and Surgery 524**<br>Operative Surgery of Small Animals | (1-2) | 2 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (2-2) | 3 |
| **Veterinary Public Health 536**<br>Infectious Diseases of Large Animals | (5-0) | 5 |
| | | 20 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 512**<br>Radiology | (2-0) | 2 |
| **Veterinary Medicine and Surgery 521**<br>Reproductive Diseases | (2-0) | 2 |
| **Veterinary Medicine and Surgery 561**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 563**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 565**<br>Large Animal Clinic | (1-7) | 3 |
| **Veterinary Medicine and Surgery 567**<br>Small Animal Clinic | (1-7) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-2) | 3 |
| **Veterinary Parasitology 583**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Pathology 577**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 573**<br>Pharmacy | (0-2) | 1 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-2) | 3 |
| | | 21 |

## SUMMER SESSION 1964

| First Term | Th Pr | Cr |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | **(9-0)** | **3** |
| **Veterinary Medicine and Surgery 562**<br>Clinical Laboratory Diagnosis | **(0-6)** | **1** |
| **Veterinary Medicine and Surgery 564**<br>Ambulatory Clinic | **(0-12)** | **1** |
| **Veterinary Medicine and Surgery 566**<br>Large Animal Clinic | **(0-21)** | **2** |
| **Veterinary Microbiology 596**<br>Poultry Diagnosis | **(0-6)** | **1** |
| | | 8 |

| Second Term | Th Pr | Cr |
|---|---|---|
| **Veterinary Medicine and Surgery 568**<br>Small Animal Clinic | **(0-21)** | **2** |
| **Veterinary Parasitology 584**<br>Clinical Parasitology | **(0-6)** | **1** |
| **Veterinary Pathology 578**<br>Applied Pathology | **(0-6)** | **1** |
| **Veterinary Physiology and Pharmacology 574**<br>Pharmacy | **(0-6)** | **1** |
| **Veterinary Public Health 592**<br>Public Health | **(6-6)** | **3** |
| | | 8 |

# THE TEXAS MARITIME ACADEMY

| | |
|---|---|
| President, A. and M. College of Texas | Earl Rudder, B.S., LL.D. |
| Superintendent | Bennett M. Dodson, Master Mariner<br>Captain U. S. Navy (Retired) |

### Board of Visitors

A 15-man Board of Visitors has been selected by the Board of Directors of the Texas A. and M. College System to advise the President of A. and M. College in matters concerning the Texas Maritime Academy. The members are prominent citizens from widely scattered areas of Texas with a large sprinkling of men distinguished in shipbuilding, steamship operations, port operations, and international commerce.

| | |
|---|---|
| Rear Admiral Sherman B. Wetmore, USNR (Retired), Chairman<br>Ship Pilot and Community Leader | Galveston |
| Captain Charles H. Glenwright, Vice Chairman<br>Marine Manager | Port Arthur |
| John A. Parker, Secretary<br>Insurance Executive | Galveston |
| Russell Brierly<br>Marine Surveyor | Houston |
| Captain John T. Everett, USMS, Maritime Administration<br>Supervisor, State Maritime Academies | Washington, D. C. |
| William J. Graff<br>Dean of Instruction, A. and M. College | College Station |
| Captain Thurman M. Gupton, USNR<br>Eighth Naval District Representative: District Judge | West Columbia |
| Captain Robert L. Jones<br>President, Master Mates and Pilots Local | Galveston |
| Emmett O. Kirkham<br>Shipyard Executive | Galveston |
| Judge Peter J. La Valle<br>County Judge | Texas City |
| Sam D. W. Low<br>Collector of Customs | Houston |
| J. C. Rudd<br>Marine Sales Manager | Orange |
| Dallas Gordon Rupe<br>Business Executive | Dallas |
| Captain Neal S. Storter<br>Steamship Company Executive | Brownsville |
| Captain Wesley A. Walls<br>Marine Surveyor | Corpus Christi |

## THE TEXAS MARITIME ACADEMY

### ESTABLISHMENT

The Texas Maritime Academy was established February 24, 1962, by the Board of Directors of the Texas Agricultural and Mechanical College System, by authority of Acts of the Fifty-sixth Legislature, Regular Session 1959, and by the federal Maritime Academy Act of 1958. The Fifty-seventh Legislature of 1961 appropriated funds for starting operations and for the development of the Texas Maritime Academy campus at Galveston. An agreement between the Governor of the State of Texas and the Maritime Administrator, Department of Commerce, has been executed. This agreement, pursuant to the federal Maritime Academy Act of 1958, commits the federal government to provide a suitable training ship, $75,000 annual funds matching state appropriations, adequate funds for the annual overhaul of the training ship, and a subsistence grant of $50 per month to each student. The State on its own part agrees to provide adequate facilities and faculty necessary to conduct a course of training for future officers of the United States Merchant Marine.

## MARITIME ACADEMIES

Maritime academies have been in existence for over 85 years and are well known in other parts of the country. The Texas Maritime Academy is one of six in the United States. Maine, Massachusetts, New York, and the United States Merchant Marine Academy are all located on the Atlantic seaboard. The California Maritime Academy serves the maritime industry on the Pacific Coast. The Texas Maritime Academy is the only maritime school dedicated to serve the industry on the Gulf Coast. For the first time, the young men from Texas and neighboring states have the opportunity to seek entrance in a maritime academy without competing with prospective students from the Atlantic and Pacific seaboards. Moreover, travel to the educational institution is reduced and opportunities for being at home more often are enhanced. In the past, few young men from Texas and neighboring states have had the opportunity for assuming key positions in the maritime industry of the Gulf Coast afloat or ashore. The Texas Maritime Academy will gradually bring about a change in this situation.

## MISSION

The mission of the Texas Maritime Academy is to provide a course of instruction and training that will qualify its graduates as officers in the United States Merchant Marine. A supplementary objective is to qualify the student for a commission in the United States Naval Reserve.

## RESPONSIBILITIES

In order to carry out the mission and objective to the fullest measure, the Texas Maritime Academy is charged with the following responsibilities:

1. To provide the student with a college education in the fields of marine engineering or in marine transportation, supplemented with a course of study in naval science.

2. To provide a sound academic background by combining a nautical education with the liberal education of a college curriculum in order to prepare the student for a successful career afloat and ashore in the maritime industry.

3. To train the student in leadership and to instill in him an abiding sense of honor, responsibility, pride in profession, and mature citizenship.

## THE UNITED STATES MERCHANT MARINE

The active merchant fleet today numbers about 900 oceangoing ships. They consist of 31 passenger-cargo vessels, 608 dry cargo ships, and 276 tankers. In addition, there are nearly 1,900 other vessels in the various reserve fleets located in eight coastal anchorages around the country.

These ships belong to some 120 ship operators employing a total of about 150,000 shore side employees. These are in addition to about 50,000 seafaring personnel actually sailing the merchant ships. Of this number about 9,000 are licensed officers. Our Merchant Marine is, then, big business.

## UNITED STATES WORLD TRADE AND SHIPPING

American business is world business. The channels of American trade and industry have never stretched so far nor flowed so fully—among our neighbors and to such faraway places as New Zealand, Australia, Liberia, Hong Kong, or Kenya. And the traffic is not one way.

American foreign trade today is not simply a matter of manufacturing goods in this country and selling them in world markets in exchange, perhaps, for exotic foreign products and raw materials not available in this country. United States plants are strung around the globe, frequently using local raw materials, local labor, managerial talents, and capital. The final product may be consumed locally or pumped into the arteries of international trade.

At the same time, we consume vast quantities of foreign goods and raw materials. Foreign nations have a substantial stake in our industries. We are constantly absorbing new ideas from abroad, new processes, and new products.

## THE MARITIME ADMINISTRATION AND THE TEXAS MARITIME ACADEMY

The Maritime Administration of the United States Department of Commerce is the agency charged with fostering the development of a merchant marine composed of the best equipped, safest, and most suitable types of vessels manned by a trained and efficient citizen personnel. Thus, the training of personnel for merchant ships is a responsibility of the Maritime Administration. The Maritime Academy Act of 1958 is the guiding program for the training of merchant marine officers in maritime academies. Under the plan each student receives a subsistence payment of $50 per month to assist in defraying the cost of uniforms, textbooks, and subsistence. State maritime academies receive a training ship and financial support from the Maritime Administration.

## THE MARITIME INDUSTRY

The maritime industry includes everyone who is involved with the transporting of people and goods by ship. There are hundreds of specific jobs in the major areas of: maritime transportation; auxiliary facilities; design, construction, and repair; trade and finance; and the port industries. The industry, as the center of our foreign trade and travel, is a vital and dynamic part of the nation's economy as well as an essential element of the United States defense program. Over ninety-nine percent of all goods in the foreign trade are carried by sea. Although we live in the air age, the place of ocean shipping is secure. Even the largest of cargo planes can carry but a fraction of the tonnage of a cargo ship, and many cargoes are of such a nature as to make air transportation entirely impractical. In terms of dollars and cents, ships offer the most economical method of transporting cargo. Air freight is over 50 times more expensive than sea shipment. Thus, it is reasonable to believe that cargo ships will continue to be the principal carriers of heavy cargoes.

To this end, the industry is engaged in a huge shipbuilding program in which old ships will be replaced by new and modern ships. The program provides for an expenditure of $4,500,000,000 for the construction of some 300 ships during the years ahead. Over 80 of these ships have been completed or are under construction.

## TEXAS—A MARITIME STATE

The true significance of Texas as a great maritime state is not always appreciated fully by its own citizens. The maritime industry in Texas has a leading role in the foreign commerce of the United States. Texas runs a close second to New York State in the number of seagoing ships entering and leaving port.

The Port of Houston, in tonnage handled, vies with New Orleans for the honor of being the second largest port in the United States. In 1961 the Port of Houston handled almost 56 million tons of cargo. The shipping of the oil industry with its ocean terminals and sea-going tankers is phenomenal.

The Port of Galveston's great cotton and grain exporting center services ships sailing to all parts of the world. Beaumont, Port Arthur, Corpus Christi, Brownsville, and other growing ports make up a maritime industry requiring thousands of highly trained and well educated men to operate it.

It is time Texas trained its own citizens to take the lead in operating its own maritime industry including its shipbuilding yards, steamship lines, port terminals, export and import houses, and hundreds of related industries.

There is no other maritime college in the South. The Texas Maritime Academy offers the first step in providing such education.

## CAREERS AS MERCHANT MARINE OFFICERS

Seafaring is a profession with few geographical limits. In the conduct of world commerce, ships of the United States Merchant Marine sail in and out of every port of call in the free world, discharging and taking on cargo and passengers, refueling, provisioning, and making repairs. Stamina, ingenuity, and courage are the fundamental characteristics of the mariner as he plies the seven seas.

Career opportunities in this profession are not limited to well-defined channels. The modern mariner finds broad horizons of adventure in the technological advances of his age. Officers of the Merchant Marine are preparing for the near day when nuclear-powered merchant ships will launch a new era in commercial propulsion. They are involved in the development and staffing of huge super-tankers and record-breaking passenger liners; in revolutionizing ship navigation and stability control; in expediting cargo-handling techniques. Each step forward opens new frontiers for the Merchant Marine and new careers for men of professional training and experience.

A deck graduate, reporting aboard his first ship as third officer, stands a watch, is responsible for life-saving equipment, and assists in other duties. When he advances his license and is appointed a second officer, he becomes responsible for the navigation of the ship. And finally, as the culmination of the difficult training that has gone before, the proud day comes when the officer receives his "master" license and is qualified to command his own ship.

A marine engineer graduate is first assigned aboard ship as third assistant engineer. He stands an engine room watch, is responsible for auxiliary machinery, and works for advancement to second assistant engineer, the first assistant, and finally to chief engineer.

## PLACEMENT

The Texas Maritime Academy expects to play a major role in the placement of its graduates. It is the only such school dedicated to serving the steamship lines whose ships ply out of ports of the Gulf of Mexico.

There will be a continual need for well-educated and highly-trained officers to man the new, modern, replacement ships in the Merchant Marine.

Few other professions offer such immediate financial rewards. New graduates of the Texas Maritime Academy may expect to earn at least $8,000 per year plus meals and quarters. Maritime academy graduates who already have risen to positions of command or are serving as chief engineers—relatively young men—are receiving annual salaries ranging from $13,000 to $18,000 and above.

## SHORE EMPLOYMENT

Although the primary aim of the Academy is to prepare young men for leadership at sea, eventually as masters and chief engineers, the marine careers open to them are not limited to the actual operation of ships. Many well educated and trained officers, after establishing successful records at sea, have been selected to become port captains and marine superintendents, or operating managers ashore. Many have advanced rapidly to positions in the executive and administrative branches of the shipping industry and to high offices in governmental agencies relating to maritime operations. Some are employed as shipping representatives in home and foreign ports. Others are attracted to a lucrative field as marine sales engineers.

## THE ACADEMY

The Texas Maritime Academy offers young men the opportunity to continue formal education and, at the same time, to prepare to become licensed ships' officers in the United States Merchant Marine.

Upon completion of the first semester, the cadet selects one of two areas of specialization: Marine Engineering or Marine Transportation. Thereafter he is known as an Engineer Cadet or as a Deck Cadet.

Upon the successful completion of the course of study, three ocean training cruises, and upon passing the United States Coast Guard license examination for a Third Mate or Third Assistant Engineer, a graduate receives a Bachelor of Science degree in Marine Transportation or in Marine Engineering.

Upon graduation the cadet who has the required qualifications may apply for a commission as Ensign, United States Naval Reserve.

## ACADEMIC PROGRAM

The first school year consists of nine months, and the remaining three school years consist of eleven months of instruction and training. The year is divided into two academic semesters and one ocean training cruise. Both the Marine Transportation and Marine Engineering curricula require the study of general education courses in addition to the professional and technical subjects.

## AFLOAT TRAINING

Each sea training period is a required, staff-supervised, educational term intended to insure necessary operational training periods and experience for all cadets.

During the three required operational training periods completed, the cadet progresses from the apprentice stage through the artificer level to the junior officer category. In addition to practical experience in ship operations, safety at sea is continuously emphasized and boat drills are conducted in preparation for the "lifeboatman" examination.

The operational training period includes visits to four to six foreign ports. Different ports are selected each year to provide cadets with a wide range of experience. Ample liberty time is provided in each port, affording cadets the opportunity to visit places of cultural and historic, as well as maritime, importance.

The Federal Maritime Administration will provide the Academy with a suitable training ship for the purpose of conducting the sea training cruise. Since the Texas Maritime Academy is new and will not have senior cadets who are able to operate the ship, it will be necessary to cruise with the cadets in the training ship of another state maritime academy until 1965.

## FIRST CRUISE

The first training cruise will commence in June 1963. Texas Maritime Academy cadets will depart in company for the Port of New York, where they will report to the commanding officer of the EMPIRE STATE IV, the training ship of the State University of New York Maritime College. The Texas cadets will sail with the 450 New York cadets for ports in Europe.

Later when enough cadets have advanced sufficiently in training to operate a ship themselves, the ship assigned to the Texas Maritime Academy will be used and operated by its own instructors and cadets. The training ship, formerly the United States Navy Hospital Ship COMFORT (to be given an appropriate name for Texas), has tentatively been assigned and will be kept at Beaumont until needed.

## THE UNITED STATES NAVY AND THE MARITIME ACADEMY

The Navy has a distinct interest in maritime training schools. However, the Navy neither requires nor desires the operation of any maritime school for the sole purpose of training Naval Reserve Officers. These schools are required for the preparation of officers to man the ships of our Merchant Marine. National defense demands an adequate Merchant Marine manned by well trained officers who possess an understanding of naval procedures and who are capable of operating with the Navy in time of war or national emergency. The Navy has participated and desires to continue to participate in the training of these officers by teaching naval science courses in the maritime schools, and granting inactive Naval Reserve commissions to those cadets meeting all qualifications.

The Navy Department, in cooperation with the Maritime Administration, U. S. Department of Commerce, has authorized physical examinations and preliminary interviews for applicants who have been accepted at the Maritime Academy. This is to determine the candidate's suitability for eventual appointment to commissioned grade in the Naval Reserve and not for either enlistment or appointment in the Naval Reserve while the cadet is enrolled at the Academy.

Candidates are required to take the naval officer's physical examination and undergo an interview at the Office of Naval Officer Procurement for processing as merchant marine students. This procedure is prescribed by Maritime Administration regulations governing admission of students to all maritime schools and governing payment of any allowances by the Federal Government. The assignment for taking the naval officer physical and interview will be made by the Academy after the candidate has undergone his admissions test and first physical examination.

Candidates for admission shall also agree in writing to apply at an appropriate time, prior to graduation, for a commission as Ensign in the United States Naval Reserve and to accept such commission if tendered. A candidate must also enroll and complete the naval science courses offered at the Academy. These requirements stated above are the qualifying factors governing the payment of the uniform, textbook, and subsistence allowance prescribed by the Maritime Administration.

Other pertinent points of the program are:

1. Students are to retain civilian status.
2. The Director of Selective Service has provided for deferment of these students.
3. After graduation those who obtain employment at sea in the Merchant Marine may be tendered an inactive Naval Reserve commission if eligible in all respects.
4. After graduation those who, through no fault of their own, are unable to obtain employment at sea in the Merchant Marine, and who volunteer for active duty, may be commissioned, if eligible, and placed on active duty if there is an actual need for their services.

## MISCELLANEOUS INFORMATION

### ACADEMY CAMPUS

The Texas Maritime Academy campus is in Galveston, 50 miles south of Houston. The campus is part of the A. and M. Marine Laboratory on spacious grounds of the former Fort Crockett on the shores of the Gulf of Mexico.

The Academy building, a three-story concrete structure, provides messing and living spaces as well as classrooms and administrative offices.

Galveston's concrete piers and warehouses provide berthing accommodations for 40 modern ships. A large shipyard is nearby. These shipyard facilities will help serve as a laboratory for the students. In addition, the NS SAVANNAH, the first atomic-powered merchant vessel in the world, is to be regularly serviced in Galveston. Galveston promises to become an important center for commercial nuclear propulsion.

Based in Galveston is the R. V. ALAMINOS, oceanographic vessel operated by the Department of Oceanography and Meteorology of A. and M. College. This 180-foot research vessel is equipped with modern diesel plant and is outfitted with a full array of electronic navigation and oceanographic apparatus. When in port she will serve as a part-time laboratory for students of the Academy. The department also operates a 65-foot auxiliary research craft. Library and other facilities of the Marine Laboratories are shared with the Academy.

### ACADEMY HEALTH SERVICES

Cadets of the Texas Maritime Academy become eligible for United States Public Health Service free medical treatment upon enrollment in the United States Maritime Service (some time before the end of the freshman year).

There is a United States Public Health Service hospital located in Galveston near the Academy campus.

During the training cruise, a qualified physician is attached to the training ship.

### UNIFORMS

Cadets of the Texas Maritime Academy will wear the uniform of the Corps of Cadets while on the A. and M. Campus. A specially designed patch will be worn on the left shoulder.

Starting with the first training cruise, the cadets will turn in the Corps of Cadets uniforms and will shift to midshipman style uniforms of dress blues, whites, and khaki. The cost of the latter have been included in the estimates of expenses.

## ADMISSIONS

### LIMITED ENROLLMENT

The ultimate enrollment of the Academy will approximate 200 students. Classes entering in September will be limited to approximately 50 new students. Qualified applicants from other states are accepted. Selection to the Academy is based on the applicant's ability to satisfy requirements as indicated by such criteria as the individual's secondary school or college grades, rank in graduating class, grade point ratio, character, and general accomplishment in high school or college. The College Entrance Examination Board test scores are considered.*

### APPLICATION FOR ADMISSION

Any person who desires to apply for admission to the Texas Maritime Academy should write the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript from each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school attendance only. It is important that these credentials be submitted well in advance of registration.

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*Scholastic Aptitude Test (SAT), English Composition Achievement Test, Mathematics Achievement Test (Intermediate or Advanced).

## ADMISSION REQUIREMENTS

An applicant must have graduated from a properly accredited secondary school with a minimum of 15 units (credits) acceptable to the College for entrance purposes. Superior students with unit deficiencies will be considered on the basis of their merit.

The 15 acceptable entrance credits shall include:

- 4 units of English
- 2 units of social science
- 2 units of algebra
- 1 unit of plane geometry
- 1 unit of natural science
- 5 acceptable elective units

It is recommended that the five elective units include additional courses from the following subject areas: foreign languages, mathematics, natural sciences, social sciences, and speech. It is strongly recommended that applicants present trigonometry, one-half unit, and solid geometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Three units in English and two units in foreign language may be substituted for four units required in English. Applicants are advised to take chemistry or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

In addition to the requirements listed above, the applicant must be at least 17 years of age but not more than 21 on the day of registration.

Also, the applicant is to be unmarried and is to remain unmarried while enrolled.

## PHYSICAL REQUIREMENTS

The applicant is required to be in good physical condition as determined by physical examination. Applicants who wear glasses must be able to pass a test, without glasses, of at least 20/40 in one eye and 20/70 in the other. Both eyes must be correctible to 20/20 with glasses. Color blindness is disqualifying.

## ADMISSION OF COLLEGE TRANSFER STUDENTS

A limited number of students from other colleges or from other schools in the A. and M. College of Texas may be accepted for registration as second semester freshmen on February 1, 1964.

### A. and M. Students

Students in other schools at A. and M. with over-all satisfactory records may change major to Marine Engineering or Marine Transportation provided they are able to present a grade of C or better in the following subjects:

| | |
|---|---|
| Chemistry 101—General Chemistry | 4 hours |
| *Engineering Graphics 105—Engineering Graphics | 2 hours |
| English 103—Composition and Rhetoric | 3 hours |
| Mathematics 102—Algebra | 3 hours |
| Mathematics 103—Plane Trigonometry | 3 hours |
| Military or Air Science | 1 hour |

Credit will be given for other subjects completed with a grade of C or better when such subjects are a requirement in the maritime program and scheduled for later semesters. Most prevalent among these subjects will be History 105 (United States History) and Mathematics 121 (Analytic Geometry and Calculus).

The number of students who may so change is limited.

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*For Marine Engineering students only.

**Transfer Students from Another College or University**

The foregoing requirements apply to applicants from other colleges or universities who wish to enter the maritime program in the second semester commencing February 1, 1964.

Admission to such advanced standing may be granted to an applicant who has satisfied the requirements listed above and outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for the total record of attendance, a grade point ratio of 1.00 (C—average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

## EXPENSES

Expenses to students of the Texas Maritime Academy are based on those of the A. and M. College of Texas. The primary difference is the additional costs which accrue during the three summer training cruises. These additional expenses added to those of the higher-cost midshipman type uniforms are, however, offset by subsistence payments received by each student from the United States Maritime Administration of the United States Department of Commerce. These payments, not to exceed $600 per year, are for the purpose of assisting in defraying the cost of uniforms, textbooks, and subsistence. In comparing expenses it is pertinent to point out that the maritime students attend eight full semesters ashore plus an additional 36 weeks in a training ship afloat. The 36 weeks afloat are equivalent to three summer sessions.

### EXPENSES

| | Freshman Year | Sophomore Year | Junior Year | Senior Year | Total |
|---|---|---|---|---|---|
| | $1,435 | $1,897 | $1,904 | $1,689 | $6,925 |
| Less Federal Aid | 450 | 600 | 600 | 600 | 2,250 |
| Net | $ 985 | $1,297 | $1,304 | $1,089 | $4,675 |

Expenses are to be paid at the beginning of each semester, but installments may be arranged. Tuition for nonresidents is $450 extra each year except for the first year, which is $300 extra. These estimated expenses are for eight full semesters and three summer sessions (sea training cruises) and include fees and costs for the following:

Tuition
Student Activities
Student Services
Property Deposit
Room Deposit
Board
Room Rent
Laundry
Textbooks and Supplies
Laboratory Fees
Uniforms
Slide Rule and Instruments
Transportation to and from New York
Cruise Expenses

All known expenses, except incidentals, have been included in the estimates.

## LOAN FUNDS

The Association of Former Students of the A. and M. College of Texas administers a series of loan funds which are available to any student who has been in the College for at least three semesters and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available, among them the A. and M. College Loan Fund, the Propeller Club of the United States, and the National Defense Student Loan Program.

### Curriculum in
## MARINE ENGINEERING

The Marine Engineering program leads to the degree of Bachelor of Science in Marine Engineering and to the U. S. Coast Guard issued license as Third Assistant Engineer, Steam and Motor Vessels, Ocean, Unlimited. Marine Engineering, which is closely related to mechanical engineering, emphasizes the design, operations, and maintenance of maritime power plants and associated equipment. Thorough preparation in mathematics, the sciences, and basic and applied engineering subjects is fundamental and necessary.

Engineering theory and practice are coordinated by relating classroom study to the student's practical experience aboard ship.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Marine Engineering 102**<br>Marine Engineering Orientation | (0-2) | 1 |
| **Marine Transportation 101**<br>Maritime Orientation | (0-2) | 1 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Naval Science 109**<br>Orientation and Sea Power | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Nautical Science 102**<br>Ship Organization and Operations | (2-0) | 2 |
| **Naval Science 110**<br>Orientation and Sea Power | (0-2) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 19 |

NOTE: After his first semester, the student is to select his major in either Marine Engineering or in Marine Transportation.

### SUMMER SESSION I

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 320**<br>Selected Reading | 1 |
| **Marine Engineering 200**<br>Basic Operations | 4 |
| | 5 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Marine Engineering 201**<br>Marine Engineering Mechanics | (3-0) | 3 |
| **Marine Engineering 203**<br>Engineering Laboratory | (1-3) | 2 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Naval Science 209**<br>Sea Power | (3-0) | 3 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Marine Engineering 204**<br>Engineering Laboratory | (1-3) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Naval Science 210**<br>Naval Weapons | (3-0) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## SUMMER SESSION II

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 485**<br>Problems | 1 |
| **Marine Engineering 300**<br>Intermediate Operations | 4 |
| | 5 |

## JUNIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Marine Engineering 301**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Marine Engineering 303**<br>Marine Thermodynamics | (3-0) | 3 |
| **Marine Engineering 307**<br>Electrical Circuits | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Nautical Science 201**<br>Naval Architecture I | (3-0) | 3 |
| **Naval Science 311**<br>Navigation | (3-0) | 3 |
| | | 18 |

| | Th Pr | Cr |
|---|---|---|
| **Marine Engineering 302**<br>Engineering Laboratory | (0-3) | 1 |
| **Marine Engineering 304**<br>Marine Thermodynamics | (3-0) | 3 |
| **Marine Engineering 305**<br>Strength of Materials | (3-0) | 3 |
| **Marine Engineering 306**<br>Marine Refrigeration and Air Conditioning | (2-2) | 3 |
| **Marine Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Nautical Science 202**<br>Naval Architecture II | (2-0) | 2 |
| **Naval Science 310**<br>Naval Operations | (3-0) | 3 |
| | | 18 |

## SUMMER SESSION III

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 485**<br>Problems | 1 |
| **Marine Engineering 400**<br>Advanced Operations | 4 |
| | 5 |

## SENIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Marine Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Marine Engineering 401**<br>Nuclear Propulsion I | (3-0) | 3 |
| **Marine Engineering 403**<br>Marine Steam and Gas Turbines | (2-2) | 3 |
| **Marine Engineering 405**<br>Steam Generators | (2-2) | 3 |
| **Marine Engineering 409**<br>Naval Architecture III | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| | | 18 |

| | Th Pr | Cr |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Marine Engineering 402**<br>Diesel Engineering | (2-2) | 3 |
| **Marine Engineering 404**<br>Marine Regulatory Law | (3-0) | 3 |
| **Marine Engineering 406**<br>Engineering Repairs | (1-3) | 2 |
| **Marine Engineering 408**<br>Nuclear Propulsion II | (2-2) | 3 |
| **Naval Science 410**<br>Principles of Leadership | (3-0) | 3 |
| | | 18 |

## Curriculum in MARINE TRANSPORTATION

The department provides a basic program for deck officer candidates. This program will have a major in the field of Marine Transportation. It is designed to combine the humanities and sciences with maritime subjects to achieve a well-rounded college curriculum which will fully equip a young man to meet the present and future needs of the maritime industry afloat and ashore.

Theory and practice are integrated by relating the scholastic efforts of the academic year to those of the sea training periods in the training ship.

The student who successfully completes the courses required by this curriculum, and after passing the required U. S. Coast Guard examination, receives the degree in Bachelor of Science in Marine Transportation and a federal license as Third Mate in the Merchant Marine.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Graphics | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Marine Engineering 102**<br>Marine Engineering Orientation | (0-2) | 1 |
| **Marine Transportation 101**<br>Maritime Orientation | (0-2) | 1 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Naval Science 109**<br>Orientation and Sea Power | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 106**<br>Spherical Trigonometry | (3-0) | 3 |
| **Nautical Science 102**<br>Ship Organization and Operations | (2-0) | 2 |
| **Naval Science 110**<br>Orientation and Sea Power | (0-2) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

NOTE: After his first semester, the student is to select his major in Marine Engineering or in Marine Transportation.

### SUMMER SESSION I

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 320**<br>Selected Reading | 1 |
| **Nautical Science 200**<br>Basic Communications, Navigation, and Seamanship | 4 |
| | 5 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Modern Language 105**<br>Beginning Spanish | (3-0) | 3 |
| **Nautical Science 203**<br>Seamanship I | (2-3) | 3 |
| **Nautical Science 204**<br>Terrestrial Navigation | (3-0) | 3 |
| **Naval Science 209**<br>Sea Power | (3-0) | 3 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 206**<br>American National Government | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Modern Language 106**<br>Beginning Spanish | (3-0) | 3 |
| **Nautical Science 303**<br>Celestial Navigation | (2-3) | 3 |
| **Naval Science 210**<br>Naval Weapons | (3-0) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## SUMMER SESSION II

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 485**<br>Problems | 1 |
| **Nautical Science 300**<br>Intermediate Communications, Navigation, and Seamanship | 4 |
| | 5 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 321**<br>International Trade and Finance | (3-0) | 3 |
| **Marine Transportation 301**<br>Ocean Transportation | (3-0) | 3 |
| **Modern Language 205**<br>Intermediate Spanish | (3-0) | 3 |
| **Nautical Science 201**<br>Naval Architecture I | (3-0) | 3 |
| **Nautical Science 301**<br>Seamanship II | (2-3) | 3 |
| **Naval Science 309**<br>Naval Machinery | (3-0) | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **History 318**<br>International Developments Since 1918 | (3-0) | 3 |
| **Marine Transportation 404**<br>Ocean Traffic Management | (2-0) | 2 |
| **Modern Language 206**<br>Intermediate Spanish | (3-0) | 3 |
| **Nautical Science 302**<br>Seamanship III | (1-3) | 2 |
| **Nautical Science 202**<br>Naval Architecture II | (2-0) | 2 |
| **Nautical Science 304**<br>Electronic Navigation | (2-2) | 3 |
| **Naval Science 310**<br>Naval Operations | (3-0) | 3 |
| | | 18 |

## SUMMER SESSION III

(Two terms of 6 weeks each at sea in training ship)

| | Cr |
|---|---|
| **English 485**<br>Problems | 1 |
| **Nautical Science 400**<br>Advanced Communications, Navigation, and Seamanship | 4 |
| | 5 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Marine Transportation 401**<br>Marine Insurance | (3-0) | 3 |
| **Marine Transportation 403**<br>Admiralty and Maritime Law | (3-0) | 3 |
| **Marine Transportation 302**<br>Marine Cargo Operations I | (2-2) | 3 |
| **Meteorology 302**<br>Weather Reports and Forecasting | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Marine Transportation 406**<br>Marine Cargo Operations II | (2-2) | 3 |
| **Nautical Science 401**<br>Seamanship IV | (2-3) | 3 |
| **Nautical Science 404**<br>The Navigator | (2-3) | 3 |
| **Naval Science 410**<br>Principles of Leadership | (3-0) | 3 |
| **Oceanography 403**<br>Tides, Waves, Currents, Ice | (3-0) | 3 |
| | | 19 |

# THE GRADUATE SCHOOL

The principal objective of the Graduate School is to offer education beyond the Bachelor's level to those men who aspire to become intellectual leaders in various professions and in various fields of teaching and research.

## ADMINISTRATION

The faculty of the Graduate School consists of such members of the teaching staff and of the staffs of the Agricultural Experiment Station, the Texas Engineering Experiment Station, the Texas A. and M. Research Foundation, and the Texas Forest Service as the President may appoint on nomination by the Dean of Graduate Studies. Appointment to the Graduate Faculty is based on recognized scholarly activity, fundamental research, or professional activity.

The Dean of Graduate Studies is the representative of the Graduate Faculty and is responsible for the administration of the academic programs of all graduate students. He administers the policies and regulations set by the Graduate Council and approved by the Academic Council.

The Graduate Council is a standing committee of the Academic Council. It consists of twelve members chosen to give adequate representation to the various parts of the Graduate Faculty. The Graduate Council, acting for the Academic Council, sets the policies and rules by which the graduate programs are administered. Committees on Graduate Instruction are appointed for each of the four degree-granting schools. These committees have general jurisdiction over matters pertaining to graduate work in each of their schools and, through recommendation and representation, participate in the decisions of the Graduate Council.

## ADMISSION

A formal application is required of all persons seeking admission to the Graduate School. The application forms, which are available at the office of the Director of Admissions, should be filed not later than four weeks prior to the opening of the semester. Admission to the Graduate School cannot be granted until all the credentials enumerated in the application form have been filed.

All communications relating to admission should be addressed to the Director of Admissions. Questions on other matters concerned with graduate work should be addressed to the Dean of Graduate Studies or to the appropriate subject matter department.

## GRADUATE DEGREES

Graduate courese of study are offered leading to the following degrees:

Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Philosophy (Ph.D.)

The Master of Agriculture, Master of Education, and Master of Engineering degrees offer broader training with less technical specialization. Individual research resulting in a thesis is not included. The 36 semester hours of work required includes specified written reports.

The Master of Arts, Master of Science, Master of Business Administration, and Master of Architecture degrees are awarded to students who have received appropriate Bachelor's degrees and have thereafter successfully completed an approved advanced course of study requiring not less than one academic year of work.

The degree of Doctor of Philosophy is offered in several fields of basic science with particular emphasis on those fields related to or supporting agriculture and engineering. The Doctor of Education degree is presently offered only in Industrial Education. A student who has received an appropriate Bachelor's degree and has thereafter completed an approved program of advanced study and research may qualify for these degrees.

## PROFESSIONAL DEGREES IN ENGINEERING

The professional degrees in engineering are available to graduates of this college. These degrees are offered on the basis of acceptable professional experience, a thesis or its equivalent, and an examination. Details concerning requirements for this degree may be obtained upon application to the office of the Dean of Graduate Studies.

## RESIDENCE

The Master's degree will be conferred only after a residence at the College of at least one academic year except that this requirement may be satisfied by residence during five summer terms of six weeks each, or an approved equivalent.

The minimum period of time required for the doctoral degree is six semesters of full-time graduate study, or its equivalent, beyond the Bachelor's degree. All of the work, except as noted below, must be done in resident graduate study at some approved educational institution, and at least two of the last four semesters must be spent at the Agricultural and Mechanical College of Texas.

Candidates for the doctoral degree will normally satisfy residence requirements by either (1) two semesters of 12 hours each, or (2) one semester of 12 hours and one summer session of 12 hours.

Full-time staff members engaged in graduate study and registered for less than 12 semester hours will receive proportionate residence credit.

## GRADUATE SCHOOL BULLETIN

There is published annually as a bulletin of the College an announcement of the work of the Graduate School, in which will be found full information concerning conditions of admission and requirements for degrees, including residence, thesis, and examinations. A copy of this bulletin is available upon request at the Office of the Director of Admissions.

# COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered in the College are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

101 to 199, courses primarily open to freshmen.

201 to 299, courses primarily open to sophomores.

301 to 399, courses primarily open to juniors.

401 to 599, courses primarily open to seniors.

601 to 699, courses primarily open to graduates.

Those undergraduate courses marked at the right by a "†" may be taken for graduate credit.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

## Department of Aerospace Engineering

Professor A. E. Cronk,
Professors R. R. Gilruth, C. H. Samson, Jr.;
Associate Professors F. C. Hall, C. A. Rodenberger;
Assistant Professor M. B. Lee

**201. Elementary Aerodymanics. (3-3). Credit 4. I, S**
Basic aerodynamic phenomena and simplified theory; elementary aerospace vehicle performance. Prerequisites: Mathematics 122 or 210 or registration therein; Mechanical Engineering 212 or registration therein; Physics 219 or registration therein.

**301. Theoretical Aerodynamics. (3-0). Credit 3. I**
Fluid statics, kinematics, energy, momentum, similarity, viscosity, boundary layer, drag, circulation, lift, potential flow, thin airfoil theory, high lift devices. Prerequisites: Aerospace Engineering 201; Mathematics 308.

**302. Experimental Aerodynamics. (1-3). Credit 2. II**
Wind tunnels and testing techniques. Wind tunnel calibration, airfoil pressure distribution, chord loading, airfoil drag by wake survey, boundary layer. Corrections of wind tunnel data for scale and other effects. Prerequisite: Aerospace Engineering 301.

**303. High Speed Aerodynamics. (3-0). Credit 3. II**
Airfoil section characteristics and critical Mach Number. Span loading, fundamentals of compressible flow, pressure coefficients, critical conditions, aerodynamic heating, shock waves, compressibility effects, sweep back, and high speed data. Prerequisites: Aerospace Engineering 301, registration in 302.

**304. Elementary Aircraft Structures. (3-0). Credit 3. I**

Aerospace vehicle load analysis, external and internal loads and reactions for trusses, beams and space frameworks. Prerequisites: Aerospace Engineering 201; Civil Engineering 305; Mechanical Engineering 212.

**306. Strength of Aircraft Materials. (2-3). Credit 3. II**

Mechanical properties of materials and their use in design of members subject to tension, compression, shear and bending. Combined stresses and margins of safety. Prerequisite: Aerospace Engineering 304.

**401. Aircraft Design. (1-6). Credit 3. II**

Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisite: Aerospace Engineering 303.

**403. Aerospace Materials Science. (3-0). Credit 3. I**

Study of nature of materials; elasticity, plasticity and flow; strength; radiation and thermal effects; corrosion; welding and brazing; adhesives. Prerequisite: Junior classification.

**405. Aircraft Structures. (3-0). Credit 3. I**

Analysis of thin sheet metal structures, including shells, beams, and compression members subjected to critical loads. Prerequisite: Aerospace Engineering 306.

**406. Aircraft Power Plant Operation. (2-3). Credit 3. I**

The use of modern instruments for testing aircraft engines; analysis of performance, design study, theory of operation. Prerequisite: Aerospace Engineering 303.

**417. Aircraft Propulsion Systems. (3-0). Credit 3. II** †

A study of the development, fundamentals, theories, construction, design, and performance of turbo-jet, ram jet, pulse jet, and rocket power plants for aircraft. Prerequisites: Aerospace Engineering 401, 406.

**420. Aircraft Vibration and Flutter. (3-0). Credit 3. I**

Analysis of fundamental vibration phenomena with application to aerospace vehicle vibration and flutter problem. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**421. Dynamics of Airplanes. (3-0). Credit 3. II** †

Linear theory of vibrations of single and multi-degree of freedom systems; self-excited vibrations. Applications of matrix algebra. Elementary theory of flutter; landing impact, gust response, aero-elastic effects, dynamic stability. Prerequisite: Aerospace Engineering 401.

**431. Spacecraft Technology. (3-0). Credit 3. II** †

Environmental conditions; detectors and sensing devices; methods of orienting spacecraft; power sources; telemetry systems; structural considerations; electronic components; integration of spacecraft components; fabrication techniques. Prerequisite: Senior classification in areospace engineering or approval of the instructor.

**481. Seminar. (1-0). Credit 1. I**

Readings, reports, conferences, and discussion. Prerequisite: Senior classification in aerospace engineering.

**485. Problems. Credit 1 to 4. 1, II, S**

Special problems in aerospace engineering assigned to individual students or groups. Prerequisites: Senior classification; approval of the Head of the Department.

**Structural Mechanics 468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

See Structural Mechanics for a full description of this course.

**Structural Mechanics 469. Analysis of Structures (2-3). Credit 3. II** †

See Structural Mechanics for a full description of this course.

## FOR GRADUATES

**601. Principles of Fluid Motion. (4-0). Credit 4. I**

Mathematical methods of analysis are emphasized. Perfect fluid theory development. Treatment of viscosity and boundary layer phenomena. Prerequisite: Aerospace Engineering 303.

**603. Aerodynamics of the Airplane. (4-0). Credit 4. II**

Application of vector analysis to two- and three-dimensional airfoil theory. Viscosity and compressibility. Drag of aircraft components. Static and dynamic stability criteria. Prerequisite: Aerospace Engineering 303.

**604. Dynamics of Compressible Fluids. (4-0). Credit 4. I**

Properties of compressible fluids, dynamics of one-dimensional motion, channel flows, shock waves, methods of observation, extension to two- and three-dimensional flow, effects of viscosity. Prerequisite: Aerospace Engineering 303 or approval of Head of Department.

**608. Aircraft Flutter Analysis. (4-0). Credit 4. II**

Theoretical development of the structural and aerodynamic equations for two- and three-dimensional flutter. Numerical solutions in practical problems to determine flutter velocities. Methods of testing to determine vibration characteristics of aircraft. Prerequisite: Aerospace Engineering 421 or Mechanical Engineering 459 or 617.

**632. Structural Design of Missiles and Spacecraft. (3-0). Credit 3. II**

Flight loads; environment; gas properties; aerodynamic and solar heating; heat transfer through structures; thermal stresses; materials and material behavior; pressure vessels; pressure-stabilized structures; aeroelastic effects and dynamic loads; structural fatigue; heat-protection systems; reliability. Prerequisite: Graduate classification in aerospace engineering or approval of the instructor.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in aerospace engineering.

**691. Research. Credit 2 to 6 each semester. I, II, S**

Technical research projects approved by the Head of the Department.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. I, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**
See Structural Mechanics for a full description of this course.

## Department of Agricultural Economics and Sociology

Professor T. R. Timm,
Professors R. E. Branson, J. G. McNeely, A. C. Magee, B. H. Nelson, Daniel Russell, R. L. Skrabanek; Associate Professors Harley Bebout, D. W. Brown, D. R. Davis, V. W. Edmondson, S. K. Fitzgerald, J. A. Kincannon, J. E. Miller*, C. A. Moore, D. S. Moore, H. B. Sorensen, Randall Stelly, H. S. Whitney**, A. B. Wooten; Assistant Professors L. M. Beck, W. D. Kutach, C. E. Shafer, K. R. Tefertiller

### AGRICULTURAL ECONOMICS

**105. Introduction to Agricultural Economics. (3-0). Credit 3. I, II**
The field of agricultural economics and its relationship to other sciences. The characteristics of our economic system and basic economic concept. Survey of the farm and ranch firm and its organization and management; structure and operation of the marketing system; functional and institutional aspects of agricultural finance; governmental policies and programs related to agriculture.

**209. Principles of Cotton Classification. (0-3). Credit 1. I**
Introductory studies of cotton quality and cotton classing through practice in identifying grades, staples, and other qualities of cotton by traditional methods and by use of instruments in a modern classing room. Twenty-five thousand samples representing all varieties and areas will be used in practice.

**314. Marketing Agricultural Products. (3-0). Credit 3. I, II, S**
A general introductory course covering all the operations involved in the movement of agricultural commodities from the farmer to the final consumer; including a detailed study of the essential marketing functions of buying, selling, transportation, storage, financing, standardization, pricing, and risk bearing as they are carried out by the middlemen in our marketing system.

**321. Farm and Ranch Records and Accounts. (2-2). Credit 3. I**
Study of methods and systems of recording and analyzing farm and ranch operational data, and acquirement of skill in summarizing and using records as effective aids in more profitable farming and ranching. Laboratory work devoted to problems in keeping and using the various kinds of records and accounts. Prerequisite: Twelve hours of credit in technical agriculture.

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*On leave of absence from 2-5-61 to 3-31-63.
**Resigned 11-12-62.

**325. Principles of Farm and Ranch Management. (2-2). Credit 3. I, II**
Application of economic and business principles to the organization and operation of farms and ranches. Special attention to the factors influencing business profits. Laboratory work devoted to development of skills in surveying, analyzing, and reorganization of the farm or ranch for more efficient and profitable operation. Actual data from farms and ranches is used. Prerequisite: Twenty hours of credit in technical agriculture.

**413. Agricultural Cooperatives. (3-0). Credit 3. I** †
Place of cooperatives in our economic system; historical development and principles of cooperative associations. Steps in organizing an agricultural cooperative; operational aspects of cooperatives including legal considerations, financing, management, and membership relations; future role of cooperatives in American agriculture. Prerequisite: Agricultural Economics 314.

**416. Economics of Livestock Marketing. (2-0). Credit 2. I** †
An economic analysis of the livestock and meat industry; marketing practices of livestock producers; characteristics of major agencies and services; problems associated with the movement of livestock from producer to consumer. Prerequisite: Agricultural Economics 314.

**422. Land Economics. (3-0). Credit 3. I, II**
A study of the economic, institutional, and physical factors involved in the utilization and control of natural resources. Prerequisite: Economics 203.

**427. Cotton Marketing. (3-0). Credit 3. II**
Geography of supply and demand for cotton; competition of other fibers. Cotton trade procedures and price making in local, central, spinner and future markets; price risks and means of reducing risks. Cost of merchandising cotton; governmental policies and regulations. Prerequisite: Agricultural Economics 314.

**429. Agricultural Policy. (3-0). Credit 3. II** †
An analysis of the causes, nature, and effects of government participation in agriculture. Emphasis is upon the interrelationship of American agriculture and the political and economic system, public administration and interest representation. Prerequisite: Economics 203.

**430. Agricultural Finance. (3-0). Credit 3. II** †
Analysis of the capital requirements for farming and ranching and how they are obtained; principles involved in the use of each type of credit necessary to sound financial management; the risk, costs, and legal aspects of credit; the security requirements, rates, and terms of the loans available from the private and governmental lending agencies serving agriculture. Prerequisite: Economics 203.

**432. Farm and Ranch Appraisal and Organization. (2-2). Credit 3. II** †
Detailed problems involved in the organization and management of specific farms and ranches, covering such matters as efficiency analysis, budget preparation, layout, and improvement. Prerequisite: Agricultural Economics 325.

**443. Applied Farm Management. (2-2). Credit 3. S** †
A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in farm management, the use of these principles in farm business planning, consideration of some of the more common management problems confronting Texas farmers, and opportunities for and methods of using the farm management approach in education work with farm people. Laboratory work based on actual farms and ranches. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**447. Agricultural Prices. (3-0). Credit 3. I**

An analysis of the factors influencing the level of agricultural commodity prices and related nonagricultural prices; major factors affecting prices of individual farm products, their relative importance and behavior; analysis of price trends and seasonal variation; parity prices; methods of forecasting demand and prices of agricultural products; future trading versus cash market prices. Prerequisite: Economics 323.

**452. International Trade and Agriculture. (3-0). Credit 3. II** †

World production and demand, present and potential, of agricultural commodities; world trade in farm products with emphasis on causal factors; national and international policies relating to agriculture; status of agricultural resources, technological progress in agriculture, and food requirements in major areas. The course is designed particularly for those interested in foreign agricultural service with governmental agencies or in export-import work with commercial concerns. Prerequisite: Senior classification.

**481. Seminar. (1-0). Credit 1. I**

Role of the social scientist in the agricultural industry; professional opportunities and responsibilities; individual investigations and reports; discussions with prominent leaders in the field. Prerequisite: Senior classification in agricultural economics or approval of the Head of the Department.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisites: Agricultural Economics 105 or Economics 203; 3 additional hours of agricultural economics; junior classification; approval of the Head of the Department and of the instructor.

## FOR GRADUATES

**602. Agricultural Market Organization and Structure. (3-0). Credit 3. I, S**

An analysis of the framework within which farm products are marketed. Institutional and functional problems in a competitive economy. Implications of horizontal and vertical integration and governmental activities. Relative influences of producers, the food and fiber industries, and consumers on market structure. Prerequisite: Agricultural Economics 314.

**603. Land Economics. (3-0). Credit 3. II**

A study of selected problems of the allocation and utilization of natural resources with special reference to government organizations, quasi-government bodies, and other interest groups. Prerequisite: Agricultural Economics 422.

**607. Research Methodology. (3-0). Credit 3. I**

A study of the scientific approach, role of theory and assumptions, bias and prejudice, attributes of problems, methods and tools of agricultural economics and sociology research. Each student is asked to critically evaluate research studies and is required to develop his thesis prospectus or its equivalent. Prerequisite: Approval of the Head of the Department.

**611. Production Economics. (3-0). Credit 3. II**

Basic principles upon which problems in agricultural production and resource use can be analyzed. Fundamental principles of production are isolated and these principles applied to agricultural data. Emphasis is placed on the conditions under which efficiency is obtained. The problems of agricultural production and resource use are treated from the standpoint of the technical unit, the firm and society. Prerequisite: Approval of the Head of the Department.

**613. Contemporary Thought in Agricultural Economics. (3-0). Credit 3. I**

A study of contemporary contributions to the thought and analyses of aggregate relationships and problems in the agricultural economy in terms of organizational efficiency and patterns in adjusting to economic development and economic fluctuations. Prerequisite: Approval of the Head of the Department.

**614. Agricultural Policy. (3-0). Credit 3. S**

An analysis of public policies and programs affecting agriculture. Development of policies and programs for agriculture and their bases. Prerequisite: Agricultural Economics 429 or approval of the Head of the Department.

**617. Economics of Consumption. (3-0). Credit 3. I**

An analysis of the consumer market for agricultural products; effects of family characteristics, such as size, age, income, and location upon consumer preferences and buying habits; motivations of consumers in buying different products; effectiveness of quality variation, packaging, and displays upon consumer purchases; the place of advertising in market creation; price policies at the retail level; and market research as a guide to marketing policies. Prerequisite: Approval of the Head of the Department.

**619. Farm and Ranch Business. (2-2). Credit 3. I**

An analysis of the interrelationships of factors affecting profits in farming and ranching. Identification of the strong and weak points in the organization and management of actual farm and ranch businesses. Special study and analysis of the management factor affords an opportunity to relate theory and practice in farming and ranching. Prerequisite: Approval of the Head of the Department.

**620. Capital Market in Agriculture. (3-0). Credit 3. S**

The role of capital in economic growth. Formation and allocation of capital in agriculture. Determinants of aggregate capital supply. Structure of the capital market for agriculture and its relationship to adjustments and technological change. Prerequisite: Agricultural Economics 430 or approval of the Head of the Department.

**627. Agricultural Market and Price Analysis. (3-0). Credit 3. S**

The application of economic theory to an analysis of agricultural product price determination and price behavior. Consideration of various types of applied economic and statistical research for price analysis and price forecasting. The relationship of product prices to marketing costs and consumer prices. Prerequisites: Agricultural Economics 447; Business Administration 303.

**629. Public Administration in Agriculture. (3-0). Credit 3. S**

A study of the basic theories in public administration in agriculture; techniques for accomplishing public goals; the legal basis for public agriculture programs; economic, social, and political considerations in agriculture programs; organizational structures for programs; formal and informal organizations. Prerequisite: Approval of the Head of the Department.

**633. Economics of Underdeveloped Agricultural Areas. (3-0). Credit 3. I**

An analysis of agricultural progress in countries with variable rates of economic growth. Relation of physical potential, food needs, land tenure, cultural and institutional factors, market structure, and trade to agricultural productivity. Importance of agriculture to total economic growth. Problems and possible solutions. Prerequisites: Economics 330; approval of the Head of the Department.

**641. Statistical Methods in Agricultural Economics. (2-2). Credit 3. II**

Planning the statistical research project, developing forms, selecting the sample, conducting the study, tabulating, analyses, and interpreting the data. Prerequisites: Business Administration 303 or Statistics 406 or equivalent; 15 hours of social science; approval of the Head of the Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A review of current literature, preparation of papers on selected topics, and discussions with visiting agricultural economists. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of agricultural economics. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the Head of the Department.

## SOCIOLOGY

**205. Principles of Sociology. (3-0). Credit 3. I, II, S**

The basic principles fundamental to an understanding of human relations are analyzed. Students are familiarized with the scope and objectives of sociology. The contributions of biology, geography, group life, and culture and their interrelationships in contributing to the development of personality are reviewed. Attempts are made to instill an appreciation for the complex processes of invention and social evolution which have produced our social systems and culture.

**206. Social Institutions and Processes. (3-0). Credit 3. II**

Sociological concepts and principles that are basic to an understanding of the complexity of modern society. Students, through first hand observation and course materials, are familiarized with social institutions, class structure, and social processes which produce social organization and disorganization. Major social institutions are viewed through the standpoint of social structure and social processes and their future roles in society's operation and influence upon the individual and groups.

**304. Criminology and Juvenile Delinquency. (3-0). Credit 3. I, II, S**

Extent and cost of crime. Causes of crime. Processes of criminal behavior. Ecology of crime. Theories of criminology and penology. The police system. Criminal and juvenile courts, the indeterminate sentence, and pardon. Punishment and treatment of criminals and juvenile delinquents. Prison systems and reformatories. Probation and parole. Recidivism and reformation. Prevention of crime. Prerequisite: Junior classification.

**306. Principles of Social Work. (3-0). Credit 3. I, II, S** †

The historic development and present organization of private and public welfare agencies and social services. Distinctive techniques of the social work profession in interviewing, group work, case work, and social work organization are emphasized. Students are prepared to assume intelligent leadership on committees and boards of welfare agencies and to explore the possibilities for professional employment in this 20 billion dollar enterprise. Twelve hours of independent field work must be performed if graduate credit is allowed. Prerequisite: Sociology 205 or 6 additional hours of sociology or other social science.

**311. Social Psychology. (3-0). Credit 3. I, II, S** †

An analysis of why people behave the way they do. The effect of social experiences and of the groups people belong to upon the development of personality. How to influence and control the behavior of people. Social adjustment and maladjustment including analysis of causes. Public opinion. Prerequisite: Three hours of sociology or psychology.

**314. Social Problems. (3-0). Credit 3. I**

Significant social problems are explored from the standpoint of the social, economic, political, and physical implications operating to produce the swift impact of social change in a dynamic society. Both academic and practical adjustments or solutions to major problems are considered at the local, state, and national levels so that the student may be better equipped to assume the responsibilities of good citizenship in meeting the problems of today. Prerequisite: Sociology 205 or approval of the Head of the Department.

**315. The Family. (3-0). Credit 3. I, II**

A study of the evolution and growth of the family as the most fundamental social institution. Basic scientific research will be used to throw light on the problems of family formation, courtship, engagement, marriage, etc. Family problems, social and personal adjustment, financing, child rearing are emphasized. Prerequisite: Junior classification.

**320. Social Anthropology. (3-0). Credit 3. I, II** †

Cultural patterns of the principal cultures are analyzed to reveal social systems, institutions, customs, values, ethos, universal constants, and problems of cultural diffusion. Trainees in technical agriculture, engineering, business, education, public health, and the diplomatic service who anticipate domestic or overseas employment are acquainted with the methods for implementing social, cultural, and technological change. Adjustment of personnel to foreign cultures is emphasized. Prerequisite: Sociology 205 or approval of the Head of the Department.

**404. Rural Community Development. (3-0). Credit 3. I** †

The objective of the course is to help future agricultural workers in doing a better job in their various specialties by recognizing and understanding group processes and organization in carrying on their program. The techniques of rural community development are explored as values to total agricultural and small town development. Community development problems in underdeveloped countries will be surveyed. Prerequisite: Approval of the Head of the Department.

**407. Human Relations in Agriculture. (3-0). Credit 3. I, II, S**

This course is designed chiefly for students in technical agriculture to help them gain broader understanding of the human factors involved in a dynamic agricultural situation. This involves the analysis of interpersonal relationships, group relationships, and institutional relationships in a rapidly changing environment.

**408. Organization for Boy Scout Work. (2-0). Credit 2. II**

History and development of the Boy Scout movement. Understanding the boy and fitting a program to meet his needs. Developing adult leaders in the boy-man institutional relationship. Specialized programs such as cubbing, senior scouting, sea scouting, etc. Fitting scouting to the boy's needs and life pattern.

**412. Population Analysis. (3-0). Credit 3. II** †

Methods of demographic analysis. The influence of population numbers, birth rate, death rate, sex ratio, age composition, nativity, racial composition, and migration on social values and social structure. Theories of population growth and change and their effects on population policies. International aspects of the demographic position of the United States. Prerequisites: Twelve hours of social science; approval of instructor.

**418. Public Opinion and Social Control. (3-0). Credit 3. I** †

Analysis of processes, planned or unplanned, by which individuals are taught, persuaded, or compelled to conform to usages and life values of groups. Nature and use of public opinion and propaganda. Prerequisite: Sociology 205.

**430. Sociological Theory. (3-0). Credit 3. I**

An analysis of (1) the development of sociological concepts and their logical interrelationships and (2) the development of sociological theories based on the utilization of these concepts. Prerequisite: Sociology 205.

**481. Seminar. (1-0). Credit 1. I**

The preparation by students of papers on the role of the social scientist in the fields of research, organization, and management within the framework of social systems. Prerequisite: Senior classification in sociology.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisites: Sociology 205; 3 additional hours of sociology; junior classification; approval of the Head of the Department and of the instructor.

## FOR GRADUATES

**601. Rural-Urban Relations. (3-0). Credit 3. I, S**

Rise, growth, and trends of cities and their impact upon rural fringe areas. The economic, commercial, residential, and industrial structures and the function of basic urban institutions. Rural and urban demographic contrasts and urban ways of life. Problems of the city and a search for the ideal city. Designed for students in architecture, administration, education, and transportation. Prerequisite: Sociology 205 or its equivalent or 12 hours of social science*.

**602. Contemporary Theory in Rural Sociology. (3-0). Credit 3. II**

The rise, spread, and development of the field of rural sociology in each of its three central phases—teaching, research, and extension. An objective appraisal of the scientific status of rural sociology and its interrelationships with other sciences. A review of the theories and contributions of past and present-day leading sociologists and other social scientists to the field of rural sociology. Prerequisite: Sociology 205 or its equivalent, or 12 hours of social science*.

**606. Rural Youth Leadership. (4-0). Credit 4. I, S**

To give special insight into the problems of our youth, and training techniques and programs needed to deal with these problems. To acquaint the advanced student with qualities, traits, techniques, attitudes, etc., of successful leaders in various fields. Prerequisite: Twelve hours of social science*.

**611. History of Social Thought. (3-0). Credit 3. I, S**

The development of social thought from ancient times to the present. Chief emphasis is placed upon sociological thinkers who have made significant contributions to the field, the theories of these men, and the background from which these theories evolved. Prerequisites: Sociology 205; 12 additional hours of social science*.

**612. The Rural Community. (4-0). Credit 4. II**

The purpose of this course is to acquaint the advanced student with the importance, problems, processes, and techniques of community development. Each student will be given an outside reading and study program to meet his particular interest and needs in his chosen field or specialty. A major purpose is to recognize the community development self-help technique as an effective method of improving rural standards of living in agriculture, health, education, recreation, beautification, etc. Prerequisite: Twelve hours of social science*.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**618. Educational Sociology. (3-0). Credit 3. S**

How our school system can strengthen our democratic way of life. The relationship of education to social organization, social change, and social control. Sociological analysis of the role of education in our society. Prerequisites: Sociology 205 or the equivalent; 9 additional hours of social science or a degree in education.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of sociology. Prerequisite. Six hours of sociology or 12 hours of supporting social science.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the instructor.

## Department of Agricultural Education

Professor E. H. Knebel,
Professor Henry Ross; Associate Professors B. D. Cook, J. W. Holcomb, Jr.,
O. M. Holt, R. C. Jaska, E. S. Webb; Instructor H. D. Brown

**301. Introduction to Agricultural Education. (1-2). Credit 2. I**

An introduction to agricultural education designed to acquaint students with the aims and functions of vocational agricultural education in public high schools, and to provide laboratory experiences in planning and conducting leadership training programs for rural youth. Prerequisite: Junior classification or approval of the Head of the Department.

**425. Course Building. (1-2). Credit 2. I** †

Preparing units of instruction in vocational agriculture for all-day, young farmer, and adult classes. Prerequisites: Agricultural Education 301; senior classification; or approval of the Head of the Department.

**426. Mehods in Adult Agricultural Education. (2-0). Credit 2. II** †

Planning educational programs and activities for adult farm people in young farmer and adult classes. Developing skill in the use of the group process in teaching. Prerequisite: Approval of the Head of the Department.

**427. Methods of Developing Farming Programs. (1-2). Credit 2. II** †

Planning and supervising farm programs of vocational agriculture students. Prerequisite: Approval of the Head of the Department.

**436. Student Teaching in Agricultural Education. (2-12). Credit 6. II**

Planning for and teaching vocational agriculture in selected high school departments in Texas. Six weeks student teaching and observation in local departments of vocational agriculture on a full-time basis. Critique of student teaching. Laboratory hours to include the six weeks student teaching. Prerequisites: Senior classification; completion of the prerequisite sequence of professional courses in agricultural education.

**441. Agricultural Extension Organization and Methods. (2-2). Credit 3. I**

A study of cooperative extension work in agriculture and home economics; its development, objectives, organization, program building procedures, and methods of teaching. Methods in selecting, training, and using leaders will be included. One week observation with a county extension agent will be required. Prerequisite: Junior or senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of vocational agricultural education or extension education with emphasis on the collection, analysis, and presentation of information. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. Advanced Methods in Agricultural Education. (3-0). Credit 3. I, II, S**

An advanced course in methods of teaching vocational agriculture. Prerequisite: Professional experience or approval of the Head of the Department.

**605. Supervised Farming. (3-0). Credit 3. I, II, S**

Advanced study of supervised farming in vocational agriculture and methods of supervising students in carrying out supervised farming programs. Prerequisite: Professional experience or approval of the Head of the Department.

**607. Future Farmer and Young Farmer Activities. (3-0). Credit 3. I, II, S**

Methods of conducting Future Farmer and Young Farmer activities. Prerequisite: Professional experience or approval of the Head of the Department.

**610. Methods in Adult and Young Farmer Education. (3-0). Credit 3. I, II, S**

A study of the methods of determining educational program needs, organizing, conducting and evaluating educational programs in agriculture for adult and young farmer groups. Emphasis on coordinating and utilizing groups and resources in a community in developing agricultural programs. Suitable for teachers of vocational agriculture, county agricultural extension agents, and other professional agriculture workers. Prerequisite: Professional experience or approval of the Head of the Department.

**613. Administration and Supervision of Agricultural Education. (3-0). Credit 3. I, S**

Problems of organization, administration, financing, and supervision of vocational agriculture, and extension work. Prerequisite: Professional experience or approval of the Head of the Department.

**615. Philosophy of Agricultural Education. (3-0). Credit 3. I, II, S**

A study of the philosophy and evaluation of agricultural education. Emphasis on the development and use of evaluative criteria and tests in the field of vocational education in agriculture. Prerequisite: Professional experience or approval of the Head of the Department.

**616. Program Building in Agricultural Education. (3-0). Credit 3. I, II, S**

Organization of programs in agricultural education and agricultural extension education on local, state, and national basis. Securing assistance of public school administrators, farmers, and county, state, and national agricultural agencies in program building. Prerequisite: Professional experience or approval of the Head of the Department.

**619. Workshop in Agricultural Education. Credit 1 to 3. I, II, S**

A workshop offered on a one-, two-, three-, or six-week or full semester basis to study selected problems in the areas of agricultural or extension education. Committees are set up to utilize consultants in specialized areas of study. Prerequisite: Professional experience or approval of the Head of the Department.

**630. Guidance and Counseling for Rural Youth. (3-0). Credit 3. I, II, S**

Analysis of occupational and vocational opportunities for rural youth, techniques of individual group counseling and guidance. Practicum in personality and occupational interest testing. Prerequisite: Approval of the Head of the Department.

**640. Methods of Technological Change. (3-0). Credit 3. I, II, S**

The dynamics of cultural change as a theoretical framework for the process of planned technological change, the methods of planning and implementing technological change, the effects of technological change and how they can be predicted abroad. The land grant college as an institutional vehicle for planned technological change. Especially adapted for foreign students and American educators and technicians preparing for duty abroad. Prerequisite: Approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Studies related to classroom, laboratory, supervised farming, adult and young farmer education activities, and agricultural extension programs. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis for Master of Science programs only. Prerequisite: Approval of the Head of the Department.

## Department of Agricultural Engineering

Professor Price Hobgood,
Professors W. E. McCune, E. T. Smerdon, J. W. Sorenson; Associate
Professors O. R. Kunze*, L. H. Wilkes; Assistant Professors W. H.
Aldred, B. R. Stewart; Instructors W. L. Bathke, R. J. McGinty

**201. Farm Power and Machinery. (2-2). Credit 3. I, II**

Construction, operation, adjustment, and servicing of farm engines and tractors. Adaptability, selection, economic utilization, construction, operation, and adjustment of the principal tillage, planting, cultivating, harvesting, and feed processing machines.

**205. Materials in Light Structures. (2-3). Credit 3. I**

Selection and utilization of materials for light structures. Specifications and cost estimation. Prerequisite: Engineering Graphics 105.

**208. Farm Machinery. (2-3). Credit 3. II**

Mechanics, design, and materials of farm machinery construction. Rotary power transmission, hydraulic controls, method of construction, functional requirement, principles of operation, safety, performance characteristics, capacity, economic utilization. Analysis of tillage, planting, harvesting and handling mechanisms. Prerequisite: Physics 218.

**213. Food Plant Engineering. (2-3). Credit 3. II**

Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.

**221. Farm Shop. (1-3). Credit 2. I**

A course for students in agricultural education and general agriculture involving carpentry and woodwork, tool sharpening, preparation of simple drawings and bills of materials, blueprint reading, and rafter cutting.

**222. Farm Shop. (1-3). Credit 2. I, II**

A course for students in agricultural education and general agriculture involving electric and gas welding, cold metal work, forging, soldering, pipe fitting, and the preparation and use of concrete.

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*On leave of absence from 9-1-62 to 8-31-63.

**301. Agricultural Structures Design. (2-3). Credit 3. I**

This course includes a study of the basic requirements of livestock buildings and storage structures including the consideration of sanitation control, environmental control, economy, convenience, and materials application. It also treats the basic requirements of the farm home. Prerequisites: Engineering Graphics 105, 106.

**324. Agricultural Engine and Tractor Design. (2-3). Credit 3. II**

Principles of farm tractor chassis design, traction devices, stability; hitches, power transmission, construction, operation and design of internal combustion engines. Engineering principles of carburetion, ignition, cooling, lubrication, hydraulic systems, and operator's comfort, convenience and safety. Methods of testing and rating tractors and power units. Prerequisites: Mathematics 307; Mechanical Engineering 212, 313, or registration therein.

**325. Farm Electricity. (2-2). Credit 3. I, II**

A course for students in agricultural education and general agriculture which covers elements of electric current generation and transmission, applications of electric heating, lighting and power, wiring motors, power rates, meter reading, safety rules and regulations.

**335. Water Control and Utilization. (2-3). Credit 3. I, II**

Elementary surveying, including chaining, leveling, and mapping as applied to farm needs. Water control and utilization emphasizing irrigation principles and practices, associated problems of drainage, and fundamentals of terracing and farm pond design.

**410. Irrigation and Drainage Engineering. (2-3). Credit 3. II** †

Engineering principles of irrigation. Water sources; measurement and distribution of water; irrigation pumps; design of surface and sprinkler irrigation systems; salinity control. Draining engineering. Design of surface and subsurface drainage systems; drainage districts and laws. Prerequisites: Agronomy 445 or registration therein; Civil Engineering 201, 311.

**413. Agricultural Structures Design. (2-3). Credit 3. II** †

Engineering principles of farm structures design; loads, reactions, and force systems; analysis and design of wood and steel beams, light frames and connections. Fundamentals of design of concrete beams, slabs, and columns as applied to agricultural buildings. Prerequisites: Agricultural Engineering 301; Civil Engineering 305.

**418. Agricultural Process Engineering. (2-3). Credit 3. I** †

Engineering principles in agricultural processing. Psychometrics and thermodynamics of air, water, water vapors and pressures, vapor transmission, drying humidification, heating, refrigeration, heat transfer, conditioning of air, fluid flow, ventilation, fan laws and air conveying. Prerequisite: Mechanical Engineering 323.

**428. Soil and Water Conservation Engineering. (2-3). Credit 3. I** †

Engineering principles of soil and water conservation. Rainfall and runoff; soil erosion by water and wind; terrace and terrace outlet design; design of agricultural reservoirs and related structures. Prerequisites: Civil Engineering 201, 311, or registration therein.

**430. Farm Electrification Engineering. (2-3). Credit 3. II** †

Principles of electricity in farm electrification. Fundamentals of alternating currents and circuits with emphasis on power, energy, resistance, inductance, capacitance and power factor. Includes the theory of magnetism and principles of transformers, generators and motors. Prerequisite: Electrical Engineering 305.

**440. Farm Electrification. (3-0). Credit 3. S** †

This course includes the fundamentals of farm wiring, lighting and the design, construction, and operation of electric water systems, refrigeration equipment, brooders, milking machines, feed processing and handling equipment, hay and grain driers, and other electric equipment used in farm production. This is a special course for teachers and prospective teachers in vocational agriculture to be offered for a three-week period during the summer.

**481. Seminar. (1-0). Credit 1. I** †

A review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.

**482. Seminar. (1-0). Credit 1. II** †

Presentation of papers dealing with new developments and results of investigations of problems related to agricultural engineering. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

Consists of selected problems in any phase of agricultural engineering. The hours of credit and specific content will depend upon the background, interest, ability, and needs of the student enrolled. Individual consultations and reports are required. Prerequisites: Junior classification; approval of the Head of the Department.

## FOR GRADUATES

**601. Instrumentation and Research Methods. (3-0). Credit 3. I**

Analysis of research techniques, the scientific method, and the design of experiments. Theory and use of instruments for research, particularly electrical-input transducers. Dimensional analysis, theory of similitude, design of research models, and development of prediction equations. Prerequisite: Approval of the instructor.

**602. Irrigation and Drainage. (3-0). Credit 3. II**

Theory and practice in irrigation and drainage. Soil moisture, moisture flow, hydraulics of wells, erosion and sedimentation of structures, and theory of water application methods. Salinity and sodicity problems and their control. Drainage methods and theory, steady state and non-steady state problems. Prerequisite: Agricultural Engineering 410 or the equivalent.

**603. Agricultural Machinery. (3-0). Credit 3. I**

The theory and practice of functional farm machinery design. Encompasses an analysis of the problem need, the functional requirements, the common materials used, the design, testing, and production of efficient operational units.

**605. Agricultural Structures. (3-0). Credit 3. I**

A study of the structural, environmental, and economic problems encountered in agricultural buildings with special emphasis on design considerations for structural materials. Also research methods and procedures as they apply to agricultural structures. Prerequisites: Agricultural Engineering 205, 413, 418.

**606. Agricultural Process Engineering. (3-0). Credit 3. II**

Basic engineering principles involved in mechanical handling, cleaning and sorting, size reduction, conditioning, and storage of agricultural products. Includes the use of refrigeration, electric energy, and radiation. Prerequisites: Agricultural Engineering 418, 430; Mechanical Engineering 323.

**609. Farm Power. (3-0). Credit 3. II**

A study of the basic theory and principles of operation as applied to internal combustion engines used for agriculture. Emphasis is given to the application and functional design requirements and testing procedures. Prerequisites: Agricultural Engineering 324; Mechanical Engineering 313, 323.

**613. Soil and Water Conservation Engineering. (2-3). Credit 3. I**

A study of soil and water conservation, with emphasis on the hydrology of agricultural watersheds, soil erosion theory, functional design of soil and water conservation structures, methods of reducing water losses, and experimental techniques. Prerequisites: Agricultural Engineering 428; Civil Engineering 463.

**685. Problems. Credit 1 to 4 each semester. I, II**

Advanced laboratory or field problems not related to student's thesis. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Research for the thesis or dissertation.

## Department of Air Science

J. F. Starkey, Colonel, USAF
Professor of Air Science

### UNITED STATES AIR FORCE

Associate Professors: Lieutenant Colonels R. W. Garrison, K. W. Gruber, B. F. Smith, C. B. Wells, Jr.; Majors F. F. Drake, Kenneth Wolf; Assistant Professors: Captains D. T. Anderson, B. G. Dudley, B. T. Duncan, L. R. Hewitt, Jr., J. F. Martin, C. W. Piper, D. N. Williamson

### BASIC COURSE OF AIR SCIENCE

**101. Foundations of Aerospace Power. (0-2). Credit 1. I**

First semester Basic Air Science. A survey of the factors of national power, the causes and types of conflict in the aerospace age, and an introduction to United States organization for national security.

Leadership Laboratory: Introduction to Air Force organization; drill and ceremonies; and the requirement for "followership" at element and flight level. Opportunities are provided for developing personal and group discipline and acquiring the training, poise, and self confidence necessary for leadership positions.

**102. Foundations of Aerospace Power. (0-2). Credit 1. II**

Second semester Basic Air Science. A continuation of the study of organization for national security and an evaluation of the professional officer in the United States Air Force.

Leadership Laboratory: Continuation of Air Science 101 laboratory.

**201. Fundamentals of Aerospace Weapon Systems. (0-3). Credit 1. I**

Third semester Basic Air Science. An introductory survey of aerospace missiles and craft, and their propulsion and guidance systems; target intelligence and electronic warfare; and nuclear, chemical, and biological warfare.

Leadership Laboratory: Practice in elementary leadership activities involving small groups and an introduction to leadership methods and cadet corps organization at the group and wing level. The cadet is provided with opportunities to test his leadership skill in situations dealing with small groups and to recognize and accept personal responsibility.

**202. Fundamentals of Aerospace Weapon Systems. (0-3). Credit 1. II**
Fourth semester Basic Air Science. Continuation of Air Science 201 to include employment of defensive, strategic, and tactical aerospace forces in peace and war; problems and military implications of space operations; and a survey of contemporary military thought.

Leadership Laboratory: Continuation of Air Science 201 laboratory.

## ADVANCED COURSE OF AIR SCIENCE

**301. Officer Development. (0-2). Credit 1. I**
First semester Advanced Air Science. A study of Air Force organization and the functions of the commander and his staff, including Air Force conferences, staff meetings, and correspondence. Concurrent enrollment in English 210 and English 401 (or 403) is a requirement for this course.

Leadership Laboratory: Development of leadership skills dealing with larger and more complex groups (i.e., groups and wings) and an introduction to command and staff principles and methods at all levels. The cadet is provided with an opportunity to assume full responsibility for significant parts of the cadet corps program.

**342. Officer Development. (2-3). Credit 3. II**
Second semester Advanced Air Science. Leadership seminar: A study of the principles and practices of leadership to include basic psychology of leadership and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Military justice system: A study of the system by which military justice is administered.

Leadership Laboratory: Continuation of Air Science 301 laboratory.

**401. Officer Development. (0-2). Credit 1. I**
Third semester Advanced Air Science. An introduction to weather and air navigation for the Air Force officer. Concurrent enrollment in History 318 or Geography 401 is a requirement for this course. (If History 318 is taken during the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Development of leadership and management understandings and skills at the command level. The cadet is given an opportunity to plan for the achievement of group objectives and supervise the implementation of cadet planning by coordination and control through cadet corps command and staff channels.

**402. Officer Development. (0-2). Credit 1. II**
Fourth semester Advanced Air Science. Presentation of material to help the cadet make a rapid, effective adjustment to active duty as an officer of the United States Air Force. Concurrent enrollment in History 318 or Geography 401 is a requirement for the course. (If History 318 is taken the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Continuation of Air Science 401 laboratory.

## Department of Animal Husbandry

Professor O. D. Butler, Jr.,
Professors T. C. Cartwright, F. I. Dahlberg, Fred Hale, H. O. Kunkel, J. K. Riggs; Associate Professors G. T. King, J. M. Shelton, A. M. Sorensen, Jr.; Assistant Professors Z. L. Carpenter, W. C. Ellis, L. D. Wythe, Jr.; Instructors D. D. Bass, Jr., H. W. Franke, D. C. Kraemer, C. M. Laywell

**107. General Animal Husbandry. (2-3). Credit 3. I, II**

This course is a study of the selection, breeding, feeding, management, and marketing of beef cattle, sheep, Angora goats, swine, horses, and meat evaluation. An introduction to the broad field of animal husbandry; an appreciation of the importance of the livestock and meats industry in American agriculture and the American economy; basic fundamental principles of animal husbandry to create a desire to learn and study more about the field.

**302. Trends in Livestock Selection. (2-2). Credit 3. II**

The natural selection of livestock in the wild state. Domestication and adaptation to different environments. The breed concept. Balancing visual selection, pedigree, and records of performance. Prerequisite: Animal Husbandry 107.

**303. Animal Nutrition. (3-0). Credit 3. I, II**

Chemical composition of feeding stuffs; composition of farm animals; digestion; metabolism and the function of nutrients; minerals; vitamins; antibiotics, hormones, and other regulators in feeds. Prerequisite: Chemistry 227 or 231.

**306. Animal Breeding. (2-2). Credit 3. I, II** †

Genetics as applied to the problems of the animal breeder. Genetic and phenotypic effects of selection. Comparison of various selection methods such as mass selection, family selection, progeny and sib testing. Selection indexes. Systems of mating such as grading, cross-breeding, inbreeding, linebreeding, outbreeding, and random mating. Genetic analysis of pedigrees. Prerequisite: Genetics 301.

**307. Meats. (2-3). Credit 3. I, II**

Study and practice of slaughtering and cutting carcasses of cattle, sheep, and hogs. Meat will be cured and meat products prepared. Uses of by-products will be considered. Factors affecting quality, palatability, and economy in selection of meats will be included. The location, structure, and functions of the endocrine glands, digestive organs, and reproductive organs will be discussed in the laboratory in connection with slaughtering. Prerequisite: Animal Husbandry 107 or approval of the Head of the Department.

**309. Feeds and Feeding. (2-2). Credit 3. I, II**

A course designed to study the principal feeds and feedstuffs used in the feeding of all classes of livestock from a practical point of view; to develop in the student an understanding of the significance of the basic feed nutrients and the application of basic principles of nutrition to formulating rations for livestock production; microscopy of by-product feeds; methods of feeding; feed processing; flexible feeding programs; feed control laws; feeding investigations. Prerequisite: Animal Husbandry 303.

**313. Horse Management and Training. (1-2). Credit 2. I**

Breeding, feeding, management, and training of quarter and pleasure horses; growing and developing foals; anatomy; unsoundness; parasites and diseases; stables and equipment; shoeing; fitting for show and sale.

**315. Livestock Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and evaluation of livestock for both breeding and slaughter purposes.

**317. Meats Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb.

**320. Animal Nutrition and Feeding. (3-0). Credit 3. II**

A review of the chemical aspects of animal nutrition. The role of carbohydrates, fats, proteins, vitamins, and minerals in animal nutrition. Nutritional requirements of farm animals. Formulation of rations. A study of feeds and feedstuffs which supply the nutritional requirements. For students of veterinary medicine. Prerequisite: Biochemistry and Nutrition 312.

**406. Beef Cattle Production. (2-2). Credit 3. I, II** †

Systems of production; establishing a breeding herd; mating and reproduction; performance and progeny records for selecting breeding stock; feeding and managing the breeding herd; systems of managing stockers and feeders; fattening cattle for market; farm steer beef production and commercial feedlot finishing; planning commercial and purebred cattle enterprises; fitting and showing; animal health; marketing. Prerequisite: Animal Husbandry 303.

**412. Swine Production. (2-2). Credit 3. I** †

Historical; feeding and handling the breeding herd during various seasons; culling; meat type hog selection records; the sow and the litter; growing and fattening pigs; forage crops; feeding on forage; dry lot feeding; choice and value of feeds; garbage feeding; prevention of disease; the purebred herd; fitting and showing. Prerequisite: Animal Husbandry 303. (Offered in 1964-65 and in alternate years thereafter.)

**414. Sheep, Goats, and Fiber Technology. (3-2). Credit 4. II**

Methods of management; selection and culling; environmental factors affecting kid and lamb production; care and feeding of lambs, kids and breeding stock; marketing of sheep and goat products. Wool and mohair; grades and lengths; physical and chemical properties; processing; judging and appraisal. Prerequisite: Animal Husbandry 303 or approval of Head of Department. (Offered in 1964-65 and in alternate years thereafter.)

**416. Livestock Management. (1-2). Credit 2. II**

A course in the feeding and management of beef cattle, sheep, swine, and horses. Especially designed for agricultural education majors. Prerequisite: Animal Husbandry 303.

**433. Reproduction in Farm Animals. (2-2). Credit 3. I, II** †

The course is designed to acquaint the students with the reproductive processes as they are exemplified mainly in cattle, sheep, swine and horses. The material presented deals with the anatomy and physiology of the male and female reproductive tracts; hormones directly controlling reproduction, estrus and estrous cycles; ovulation; mating; gestation; pregnancy tests; parturition; sperm physiology; semen evaluation; collection and storage of semen; factors affecting fertility rates and the primary causes of sterility in females and males. Prerequisite: Veterinary Anatomy 202 or approval of Head of Department.

**437. Marketing and Grading of Livestock and Meats. (2-2). Credit 3. I, II**

Factors determining market classes and grades of feeder, stocker, and slaughter animals; grading feeder, stocker, and slaughter animals; marketing machinery and handling market livestock; purebred sales; shipping losses; shrinkage; fills. Prerequisite: Senior classification.

**442. Advanced Livestock Judging. (0-3). Credit 1. II**

An advanced course in the selection and evaluation of livestock. Prerequisite: Animal Husbandry 315 or approval of Head of Department.

**444. Large Animal Nutrition. (3-0). Credit 3. II** †

A consideration of feed energy and its utilization. A study of the metabolic and physiological bases for quantitative requirements of large animals for nutrients. Comparison of the nutrition of ruminants and monogastric animals. Prerequisites: Animal Husbandry 303; Poultry Science 411 or approval of Head of Department.

**447. Advanced Meat Selection. (0-3). Credit 1. II**

An advanced course in the selection and evaluation of carcasses and wholesale cuts of beef, pork, and lamb as they are correlated with live animal evaluation. Prerequisite: Animal Husbandry 317 or approval of the Head of the Department.

**481. Seminar. (1-0). Credit 1. I, II**

A review of current literature and research problems related to the livestock industry. Prominent men in the field of animal husbandry may be invited to conduct the seminar. For senior students in animal husbandry.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of animal husbandry. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**600. Advanced Livestock Management. Credit 3. S**

A special three-week workshop course for teachers of vocational agriculture to be offered during the summer. This course includes problems in all phases of animal production selected by the group under the supervision of the instructor.

**605, 606. Advancements in Beef Cattle Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of beef cattle production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of beef cattle. Prerequisites: Animal Husbandry 306, 406; or approval of Head of Department.

**616. Animal Genetics. (3-3). Credit 4. II**

The specialized study of animal genetics and population genetics especially as related to the improvement of herds, flocks, or other groups within a species. Emphasis is placed on causes of change in gene frequency, methods of selection, systems of mating and heterosis; the inter-relationship among these forces and their measurement. Prerequisites: Animal Husbandry 306; Genetics 603; Statistics 406.

**619, 620. Advancements in Sheep and Angora Goat Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of sheep and angora goat production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of sheep and angora goats. Prerequisites: Animal Husbandry 306, 414; or approval of Head of Department. (Offered in 1963-64 and in alternate years thereafter.)

**621, 622. Advancements in Swine Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relating to the various phases of swine production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of hogs; fitting swine production to the whole farm enterprise; special problems relating to the planning and operation of swine production units. Prerequisites: Animal Husbandry 306, 412; or approval of Head of Department. (Offered in 1964-65 and in alternate years thereafter.)

**628. Animal Breeding. (2-0). Credit 2. I**

A course designed to acquaint the student with the current status of knowledge in the field of animal breeding through a critical survey of the literature. Emphasis is given papers dealing with problems of breeding for quantitative traits of economic importance in farm animals including beef cattle, dairy cattle, poultry, sheep, and swine. Considerable attention is focused on methods which have been used or are available for use in studying animal breeding problems. Prerequisite: Animal Husbandry 616. (Offered in 1963-64 and in alternate years thereafter.)

**631. Physiology of Reproduction. (2-0). Credit 2. II**

A critique of scientific literature concerning the processes of reproduction in farm mammals. Students will compile, evaluate, and summarize the literature on various phases of this subject. Consideration will be given to special problems on which further investigations are desirable and methods of outlining research projects for them. Prerequisite: Animal Husbandry 433.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the field of animal husbandry. Review of current literature and presentation of papers on selected animal husbandry topics. Prerequisites: Graduate classification; major in animal husbandry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced studies in animal husbandry problems and procedures. Problems assigned according to the experience, interest, and needs of the individual student. Registration by approval of Head of Department. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the student's thesis or dissertation in the fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals, and physiology of reproduction. Prerequisite: Graduate classification.

## Division of Architecture

Professor T. R. Holleman,
Professors J. G. McGuire, M. M. Rotsch, Willard Strode, Richard Vrooman*, R. F. White; Associate Professor B. H. Evans; Assistant Professors W. G. Horsley, S. T. Lanford, J. H. Marsh, III, M. A. Nowak, A. L. Stacell, W. C. Steward, Guillermo Vidaud, W. G. Wagner, J. C. Walden**, C. R. Watson; Instructors S. M. Vaught, D. G. Woodcock; Lecturer Joseph Donaldson, Jr.; Visiting Critics C. Granger, A. Peery, C. C. Rudd

### ARCHITECTURE

**101. Design I. (0-6). Credit 2. I, S**

Analysis and application of the principles of design, with emphasis on the visual elements and the basic concept of their organization.

**102. Design I. (0-6). Credit 2. II, S**

Extension of Architecture 101. Further study and application of the principles of design, with emphasis on the proper use of materials in the basic order of space. Prerequisite: Architecture 101.

**115. Architectural Graphics. (1-3). Credit 2. I, S**

Drafting techniques; the principles of shades and shadows; perspective drawing.

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*On leave of absence from 9-1-61 to 8-31-63.
**On leave of absence from 6-1-62 to 5-31-64.

**116. Architectural Graphics. (1-3). Credit 2. II, S**

Continuation of Architecture 115; perspective drawing; techniques of architectural delineation and graphic design. Prerequisite: Architecture 115.

**201. Design II. (0-12). Credit 4. I**

Extension of first-year design principles and graphics. Studies of structures and structural materials. Site and building relationships. Design of simple buildings. Color selection. Prerequisites: Architecture 102, 116.

**202. Design II. (0-12). Credit 4. II**

Continuation of Architecture 201. More thorough detailing of design solutions, especially in small buildings. Prerequisites: Architecture 201, 205.

**205. Graphic Art. (0-6). Credit 2. I, S**

Application of principles of design to graphic art concepts, media and techniques. Prerequisites: Architecture 102 for architectural students; equivalent experience preferred for others.

**206. Graphic Art. (0-6). Credit 2. II, S**

Continuation of Architecture 205. Further application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 205 or equivalent.

**227. Structural Principles. (3-0). Credit 3. I**

(For Design Students) Examination of structural systems and their structural, economic, and esthetic suitability as applied to architectural problems. Review of first year mathematics and an introduction to calculus as applied to structural design. Prerequisites: Mathematics 102, 116.

**228. Elements of Mechanics. (3-0). Credit 3. II**

Analysis of the external effects of a force system acting on a body at rest. Determination of section properties with emphasis leading to architectural structures. Prerequisite: Architecture 227 or Mathematics 223.

**253. Technology of Materials. (2-0). Credit 2. I**

A study of materials of construction, their properties, manufacture, characteristics, and uses. Prerequisite: Sophomore classification.

**254. Technology of Materials. (2-0). Credit 2. II**

Selection of materials, methods of construction. Prerequisite: Architecture 253.

**301. Design III. (0-15). Credit 5. I**

Intermediate design stressing complete solutions to individual problems. Emphasis on concept, methods, and materials of construction. Seminars dealing with architectural and related design fields. Prerequisite: Architecture 202.

**302. Design III. (0-15). Credit 5. II**

Further studies in intermediate design enlarging upon Architecture 301. Prerequisite: Architecture 301.

**305. Graphic Art. (0-6). Credit 2. I, S**

Continuation of Architecture 206. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 206 or equivalent.

**306. Graphic Art. (0-6). Credit 2. II**

Continuation of Architecture 305. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 305 or equivalent.

**325. Survey of Contemporary Art. (1-0). Credit 1. I**

A survey of the background and development of contemporary art, including the objectives, terminology, idioms, techniques and media of painting, sculpture and the graphic arts, with particular emphasis on their relation to architecture and the allied arts. Prerequisites: Junior classification for architecture students; sophomore classification for others.

**326. Survey of Contemporary Art. (1-0). Credit 1. II**

Extension of Architecture 325, with emphasis on relating contemporary art trends to cultural and technological developments. Prerequisite: Architecture 325 or equivalent.

**327. Basic Structures. (3-0). Credit 3. I**

Fundamentals of strength of materials with emphasis on their application to architectural structures. Prerequisite: Architecture 228.

**328. Steel Structures. (2-2). Credit 3. II**

Application of the principles of statics and strength of materials to the design of architectural steel structures. Prerequisite: Architecture 327.

**331. Mechanics and Materials. (2-3). Credit 3. I**

A terminal course designed to acquaint the student with the general principles of mechanics and strength of materials and to give him some facility in their application to simple framing systems. (For student in Industrial Education.) Prerequisites: Mechanical Engineering 101; Physics 201.

**335. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. I**

To acquaint and familiarize students with types, classes, functions, and limitations of mechanical and electrical equipment and their components. Various systems of plumbing, piping, heating, cooling, electrical distribution and wiring systems are studied in their relation to building construction. Prerequisites: Physics 202; junior classification.

**336. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. II**

A continuation of Architecture 335. Further study is made of the components of mechanical and electrical equipment as to their logical applications in completed systems of plumbing, space conditioning, and electrical wiring. Prerequisite: Architecture 335.

**339. Art and Civilization. (3-0). Credit 3. I, S**

Historical survey of the cultures of man with respect to art and architecture. Prerequisite: Junior classification.

**340. History of Architecture. (3-0). Credit 3. II**

Historical study of the development of architecture from the Pre-Classic through the Greek and Roman Classic, the Early Christian, Byzantine, Saracenic, and Romanesque periods. Prerequisites: Architecture 339 for students in architecture; junior classification for others.

**401. Design IV. (0-15). Credit 5. I**

Architectural and planning problems, with emphasis on analysis, research and design. Study of relationship of architecture, landscape architecture, city and regional planning, and other related design fields. Prerequisite: Architecture 302.

**402. Design IV. (0-15). Credit 5. II**

Continuation of Architecture 401, with architectural and planning problems of a more complex nature. Prerequisite: Architecture 401.

**427. Concrete Structures. (2-3). Credit 3. I, S**

Study of reinforced concrete for architectural structures; analysis and design; systems of forming. Prerequisite: Architecture 328.

**428. Roof Structures. (2-3). Credit 3. II, S**

The analysis and design of conventional roof system; roof trusses, beams and columns, and current roof deck systems. Prerequisite: Architecture 328.

**433. Architectural Environment. (3-0). Credit 3. I, II** †

Study of environmental factors related to architectural design in terms of natural lighting, natural ventilation and sound. Prerequisites: Physics 202; junior classification.

**439. History of Architecture. (3-0). Credit 3. I**

Historical study of the development of architecture from the Gothic through the Renaissance and Post-Renaissance periods of Europe. Prerequisite: Architecture 340.

**440. History of Architecture. (3-0). Credit 3. II**

Historical study of American Period architecture, and the background, principles, philosophies, and significant figures of the Contemporary Movement in America and Europe. Prerequisite: Architecture 439.

**454. Specifications and Working Drawings. (1-6). Credit 3. I, II**

Detailed specifications; supervision and superintendence; building laws and codes; working drawings. Prerequisites: Architecture 202, 254.

**500. Summer Practice. Twelve weeks; required; no credit. S**

Summer practice in architectural offices or with building contractors as the student may be registered in the Design curriculum or in the Construction curriculum. Required previous to registration for the fifth year.

**501. Design V. (0-15). Credit 5. I** †

Advanced architectural and planning problems, with emphasis on analysis, programming, research, site study, concept, consideration of related design fields, client contact and promotion. Prerequisite: Architecture 402.

**502. Design V. (0-15). Credit 5. II** †

Continuation of Architecture 501; problems of a more complex nature, with emphasis on awareness of office practice. Prerequisite: Architecture 501.

**527. Structural Systems. (2-3). Credit 3. I** †

Advanced studies in the systems of architectural structures. Prerequisites: Architecture 427, 428.

**528. Structural Systems. (2-3). Credit 3. II** †

Study of structural problems as related to actual professional practice; special consideration of design factors, new materials, codes, economy, specification surveys of costs. Prerequisite: Architecture 527.

**554. Professional Practice. (2-0). Credit 2. I, II** †

To familiarize the student with the usual problems of office practice, professional relations, ethics, building law and contracts. Prerequisite: Senior classification.

**556. City Planning. (2-3). Credit 3. I** †

Survey of planning principles and procedures; legal aspects; physical and social development of the city; housing. Prerequisite: Senior classification.

**581. Seminar. (1-0). Credit 1. II**

Seminars presented orally by students, faculty, and professional people, with subjects relating to architecture and the construction of buildings. Prerequisite: Fifth year classification.

**585. Problems. Credit 1 to 4. I, II, S**

A course which permits work on a special project in architecture, landscape architecture, or construction. Project must be approved by the Head of the Division of Architecture. Prerequisites: Fifth year classification in architecture or senior classification in landscape architecture; approval of the Head of the Division.

## FOR GRADUATES

**627. Contemporary and Creative Structures. (2-2). Credit 3. I**

Studies and analyses of contemporary and creative structures as related to architectural design, with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 528 or the equivalent.

**628. Contemporary and Creative Structures. (2-2). Credit 3. II**

Continuation of Architecture 627. Studies and analyses of contemporary and creative structures as related to architectural design with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 627.

**629, 630. History and Archaeology. (2-0). Credit 2 each semester. I, II**

Individual problems of study and research in the field of American architecture and archaeology.

**681. Seminar. (1-0). Credit 1 each semester. I, II, S**

Review of current work in architecture; original presentation on selected topics.

**685. Problems. Credit 1 to 4. I, II, S**

Individual problems involving the application of theory and practice in the design and construction of buildings and groups of buildings.

**691. Research. Credit 2 to 4 each semester. I, II, S**

Research for thesis.

## LANDSCAPE ARCHITECTURE

**201. History of Landscape Design. (3-0). Credit 3. II**

A study of the art of landscape design from the earliest efforts to the present day. Lectures, reference reading, library sketches, and reports.

**300. Summer Practice. Ten weeks, required. No credit. S**

Approved summer practice with a recognized landscape architect or nursery.

**304. Landscape Construction. (2-3). Credit 3. I**

Treatment of various phases of work included in a landscape development. Finish grading, drainage, and preparation of detailed drawings. Field practice in construction phases. Prerequisite: Civil Engineering 201.

**305. Planting Design. (1-3). Credit 2. II**

The use of plant materials in the composition of landscape design. Study of the mass form and texture of plant materials in relation to one another as well as to structures and site development. Plans, sketches, and models. Prerequisites: Floriculture 207; Landscape Architecture 320.

**320. Landscape Design I. (0-12). Credit 4. I**

Delineation of landscape forms; drafting, lettering and introductory composition, analysis and solution of typical site problems. Prerequisites: Architecture 102, 116; Floriculture 207.

**321. Landscape Design II. (0-12). Credit 4. II**

A second course in landscape design. Arranged to give a general knowledge of the various problems met in the practice of landscape architecture, including private, semi-public, and public areas. Prerequisites: Civil Engineering 201; Landscape Architecture 320.

**404. Landscape Construction. (2-3). Credit 3. I**

A continuation of Landscape Architecture 304. More advanced problems in landscape development are covered. Prerequisite: Landscape Architecture 304.

**411. Landscape Design for the Architect and Engineer. (2-2). Credit 3. I**

Designed to present the principles of, and technical requirements involved in the landscape development of residential, industrial, and other outdoor areas. Special emphasis is placed on the relationship of the architectural and engineering professions to such developments. Not open to students majoring in landscape architecture.

**420. Landscape Design III. (1-15). Credit 6. I**

Major landscape design problems and their respective applications. Private estates, parks, subdivisions, and other private and public areas. Plans, sketches, and models. Prerequisite: Landscape Architecture 321.

**421. Landscape Design IV. (1-15). Credit 6. II**

Advanced landscape design. A continuation of Landscape Architecture 420. More advanced problems as assigned with added emphasis on city and regional planning. Prerequisite: Landscape Architecture 420.

## Basic Courses

Director S. A. Kerley,
Professor D. F. Parry; Assistant Professors U. W. Crow, L. H. Hope,
W. D. Kutach; Instructor R. L. Provost

**102. College Reading. (0-3). Credit 1. I, II, S**

A laboratory course designed to develop in students maximal proficiency in reading college level materials. Rate of reading, comprehension, and vocabulary are improved through programmed exercises and use of teaching machines. Skills important in surveying, skimming, scanning, reviewing, and studying written material are developed. Students with advanced standing may emphasize research, scientific, or analytic reading skills.

**103. College Study. (0-2). Credit 1. I, II, S**

A laboratory course designed to familiarize the student with the principles of learning and their application to the study of specific college subjects. Planning study activities, notetaking, basic textbook study methods, examination skills, preparing reports, and other factors related to academic success are considered in this course. Self-tests and exercises for improving basic abilities and achievements in various courses are provided.

**105. The World of Work. (0-2). Credit 1. I, II**

A course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas will be studied intensively and each student will be given an opportunity for studying his aptitudes and interests and relating them to various vocational requirements.

**106. Survey of Man's Knowledge. (0-2). Credit 1. II**

A survey course designed to acquaint the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature will be investigated.

## Department of Biochemistry and Nutrition

Professor C. M. Lyman,
Professors J. R. Couch, H. O. Kunkel, J. M Prescott, Raymond Reiser,
L. R. Richardson; Associate Professors B. J. Camp, J. W. Dieckert, U. G.
Whitehouse; Assistant Professor P. F. Parks; Lecturer H. R. Crookshank

**312. Veterinary Physiological Chemistry. (3-6). Credit 5. I**

A study of the chemical nature of physiological processes, including the synthesis and breakdown of body tissues and the chemical changes undergone by metabolites from ingestion to excretion. Variations among domestic animals in normal and abnormal conditions will be considered. Prerequisite: Chemistry 228.

**401. Human Nutrition. (3-0). Credit 3. I** †

A study of the functions of food constituents in health and in physiological stress. The economic, national, and international aspects of human nutrition. Prerequisite: Junior classification.

**410. Introductory Biochemistry. (3-3). Credit 4. I** †

The chemistry of the major constituents of living organisms. Biophysical and biochemical processes in plants and animals are stressed. The laboratory work includes the application of quantitative analytical procedures to plant and animal tissues and fluids. Prerequisites: Chemistry 223 and 231 or 228.

**430. Electron Microscopy. (2-3). Credit 3. II** †

Descriptive treatment of various aspects of electron microscopy and laboratory practice employing selected specimens. Elementary discussion of electron optics, design of electron microscopes, photographic plates, underfocusing, overfocusing, asymmetry, colloidal state, shadow casting. Biological and physical science applications in all technical departmental fields of the College given equal attention. Prerequisite: Senior or graduate classification in a physical or biological science, or approval of the instructor.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit laboratory investigations or the study of subject matter not included in established courses. Prerequisite: Approval of Head of the Department.

**Animal Husbandry 444. Large Animal Nutrition. (3-0). Credit 3. II** †

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 411. Poultry Feeding. (3-2). Credit 4. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**611. General Biochemistry. (3-0). Credit 3. I**

Chemistry of the principal constituents of living cells, with an introduction to intermediary metabolism. Prerequisites: Chemistry 207 or 316, 228.

**612. Laboratory Procedures in Biochemistry. (0-6). Credit 2. I**

A laboratory course designed to familiarize the student with the application of chemical and biological methods to the solution of fundamental biochemical problems. Prerequisite: Biochemistry and Nutrition 611 or registration therein.

**613. Vitamins. (3-0). Credit 3. II**

The role of vitamins in animal nutrition and their occurrence in plant and animal tissues. Prerequisite: Chemistry 228.

**614. The Determination of Vitamins and Minerals. (0-3). Credit 1. II**

A laboratory course designed to familiarize the student with methods for the determination of vitamins and minerals in biological materials. Prerequisite: Biochemistry and Nutrition 613 or registration therein.

**615. Experimental Animal Procedures. (0-3). Credit 1. II**

A laboratory course involving the management, preparation of purified rations, and the production and cure of nutritional diseases. Prerequisites: Biochemistry and Nutrition 613, 614 or registration therein.

**618. Chemistry and Metabolism of Lipids. (2-0). Credit 2. II**

An advanced course in lipid chemistry and metabolism. Prerequisite: Biochemistry and Nutrition 611.

**619. Proteins. (2-0). Credit 2. I**

Advanced studies on the chemical, physical, and biological properties of proteins. Particular emphasis will be placed on the biological synthesis and metabolism of proteins. Prerequisite: Biochemistry and Nutrition 611.

**620. Advanced Biochemical Techniques. (0-6). Credit 2. S**

A laboratory course involving practice in the use of special techniques and instruments employed in biochemical research and the isolation, identification, and analysis of biological compounds. Preparation of representative enzymes and laboratory work on factors affecting their action. Prerequisites: Biochemistry and Nutrition 612, 624.

**624. Enzymes. (2-0). Credit 2. II**

General principles of enzyme chemistry. The physical chemistry of enzyme action. Types of enzymes and coenzymes. Enzymes in the patterns of metabolism. Prerequisites: Biochemistry and Nutrition 611; Chemistry 324 or 342; or approval of instructor.

**626. Radioisotopes Techniques. (2-3). Credit 3. I**

A general course on the nature and utilization of isotopes in chemical and biochemical studies. History, general properties of nuclei, nuclear reactions, radiations; health physics and instrumentation will be included. Prerequisites: Chemistry 316, 317; Physics 201, 202.

**627. Mineral Nutrition and Metabolism. (2-0). Credit 2. II**

A study of the role of minerals in animal nutrition with emphasis on physiological function, biochemical interrelationships with other minerals and other nutrients, deficiency symptoms and nutritional significance. Prerequisite: Biochemistry and Nutrition 410 or 611.

**630. Metabolism. (3-0). Credit 3. II**

A descriptive consideration of the various chemical pathways of metabolism. Prerequisites: Biochemistry and Nutrition 611, 613.

**632. Radioactive Tracer Techniques in Metabolism. (1-3) or (1-6). Credit 2 or 3. II**

The use of isotopes in measuring the metabolic pool, precursor-product relationships, isotopic competition, cycles and intermediates, isotopic dilution and double dilution, permeability, adsorption and absorption and assay of common elements. Prerequisites: Biochemistry and Nutrition 611, 612, 626, or approval of instructor.

**634. Techniques in Lipid Chemistry. (0-6). Credit 2. II**

This course is designed to acquaint the student with recently developed techniques in chemical and biochemical investigations. Prerequisites: Biochemistry and Nutrition 612, and 618 or registration therein.

**640. Clinical Chemistry. (2-6). Credit 4. II**

A study of the quantitative distribution of body constituents and their physiological interpretations. Prerequisites: Biochemistry and Nutrition 312 or 410 or 611, or Biology 433, or Veterinary Physiology and Pharmacology 427.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

The study and discussion of original articles in biochemistry and nutrition and related fields designed to broaden the understanding of problems in the field and to stimulate research.

**685. Problems. Credit 1 or more each semester. I, II**

An advanced course in biochemical laboratory procedures including preparations and instrumentation. Problems designed according to the experience, interests, and needs of the individual student.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Laboratory facilities are available for original investigations in various phases of biochemistry and nutrition. Prerequisite: Approval of major advisor.

**Genetics 631. Biochemical Genetics. (2-0). Credit 2. I**

See Genetics Section in the Department of Plant Sciences for a full description of this course.

## Department of Biology

Professor J. G. Mackin,
Professors S. O. Brown, L. S. Dillon, W. J. Dobson, H. L. Gravett, S. H. Hopkins, Charles LaMotte, J. J. Sperry; Associate Professors E. W. Hupp, G. M. Krise, A. B. Medlen, N. P. Wood; Assistant Professors W. J. Clark, D. D. McClain, Jr.; Instructors J. L. Boswell, R. W. Flournoy, Z. J. Kapadia, J. L. Murad, W. V. Robertson

Courses in the biological sciences administered by the Department of Biology include sequential programs in botany, microbiology, and zoology. All courses, irrespective of subject matter area, bear the departmental designation (Biology), and a course number from a single numerical sequence. The nature of the offerings is more clearly indicated, however, by the subject matter grouping shown on the following pages.

### GENERAL BIOLOGY

**115. Survey of Biology. (3-3). Credit 4. I, II**

A summarization of biological forms and principles and their impact upon man and his affairs.

**225. Personal and Public Health. (2-0). Credit 2. I**

A general introduction to personal and community health. Designed primarily to enable the individual to utilize available knowledge and facilities to raise the health standard of his home and community.

**330. Life Science. (2-0). Credit 2. I, II**

Readings of grouped essays covering fifteen of the major subdivisions of life science together with integrating lectures designed to fit each into its place in life and industry. Prerequisite: Junior classification. (Not open to those with more than 7 hours of credit in biology.)

**337. Organic Evolution. (2-0). Credit 2. I, II**

A study of the evidences of the evolution of plants, animals, and man. Phylogeny and interrelationships of living things, the main lines of evolution, variation and the origin of species will be studied; man and the future considered.

**439. The Development of the Biological Sciences. (2-0). Credit 2. II**

A survey of the beginnings and development of biological discoveries and the lives and contributions of men who were outstanding in the general field of biology before 1900. Prerequisite: Fifteen hours of biological science.

**481. Seminar in Biology. (1-0). Credit 1. I** †

Recent advances. For graduates and advanced undergraduate majors in either microbiology, botany, or zoology. May be repeated once for credit not to exceed two hours.

**482. Seminar in Biology. (1-0). Credit 1. II** †

Integration of the branches of biological science. May be repeated once for credit not to exceed two hours.

**485. Biological Problems. Credit 1 to 4. I, II**

Problems in the various phases of plant, animal, and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

## FOR GRADUATES

**600. Teaching of High School Biology. (2-3). Credit 3. S**

A study of the problems and techniques of teaching biology in the secondary school, along with appropriate subject matter. The laboratory work emphasizes those exercises, projects, and materials which are most useful in the high school biology laboratory and in stimulating interest in the subject. Prerequisite: Approval of the Heads of the Biology and Education and Psychology Departments.

**654. Radiation Biology. (3-0). Credit 3. II**

Lecture and demonstration reviewing the physical theory of radiations important to living organisms with especial emphasis on ionizing radiation; X-ray, gamma, alpha, beta and neutron. Survey of the effects of ionizing radiations on biological systems. Prerequisite: Graduate classification in biological or agricultural science.

**660. Aquatic Ecology. (2-3). Credit 3. II**

A study of fresh water as an environment; its physical and chemical characteristics; the plant and animal communities which inhabit it; and the mechanisms by which the physical and chemical characteristics and the interactions of the biological populations affect the distribution, population dynamics, and productivity of the aquatic organisms. Prerequisites: Biology 327 and 435 or the equivalent; graduate classification or approval of the instructor. (Offered in 1963-64 and in alternate years thereafter.)

**661. Cellular Physiology. (2-3). Credit 3. I**

A consideration of the physiochemical nature of the cell and its relationship to the environment with emphasis on conversion of energy and matter as required by the cell as a living unit. Prerequisites: Graduate classification in biology or animal or plant science; approval of the instructor.

**681. Seminar. (1-0). Credit 1. I, II**

Detailed reports on specific topics in the field chosen. Prerequisite: Graduate classification in the appropriate field.

**685. Problems. Credit 1 to 4 each semester. I, II**

Limited investigations in fields other than those chosen for thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Prerequisite: Approval of ranking professor in the field chosen.

## BOTANY

**101. General Botany of Seed Plants. (2-3). Credit 3. I, II**

The seed plant as a living unit; external and internal structures in relation to life processes; reproduction and life history.

**102. Taxonomy of Flowering Plants. (2-3). Credit 3. I, II**

Designed to give training in the use of keys and in the identification of flowering plants, family characteristics and relationships, and other applied phases of plant science. Prerequisite: Biology 101.

**327. Fundamental Plant Morphology. (2-3). Credit 3. I**

Structural, reproductive, and taxonomic features of representatives of the major plant groups, with particular attention to groups not covered in Biology 101. Prerequisite: Biology 101.

**349. Plant Taxonomy. (2-3). Credit 3. S**

Study and identification of the flora of selected areas, techniques of collection and preparation of plant specimens. Studies in plant distribution and relationships. Prerequisite: Biology 101 or 115.

**353. Mycology. (2-3). Credit 3. II** †

An introduction to the study of fungi, including structure, reproduction, ecological relationships, and taxonomic aspects. Prerequisites: Biology 101, 206, or approval of instructor. (Offered in 1964-65 and in alternate years thereafter.)

**453. Plant Anatomy. (2-3). Credit 3. I** †

Fundamental anatomy of the vegetative and reproductive organs of the plant with emphasis on development of tissue types. Technique of staining and mounting of plant tissues. Prerequisite: Six hours of plant sciences including Biology 101 or the equivalent.

## FOR GRADUATES

**608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

A study of the form, structure, reproduction, and ecology of the algae, with detailed work on selected locally available forms, both marine and fresh water. Prerequisite: Biology 327 or 353 or approval of the instructor. (To be offered in 1964-65 and in alternate years thereafter.)

**615. Cytology. (2-6). Credit 4. I**

An intensive study of the organization and activities of the cell, with emphasis on topics related to cytogenetics and cytotaxonomy. Prerequisites: Genetics 301; approval of the instructor.

**619. Systematic Botany. (2-6). Credit 4. I**

Principles of taxonomy. Phylogenetic considerations and criteria used in schemes of classification. History of classification. Nomenclature and identification. Field and herbarium techniques. Prerequisites: Biology 102, 327, or approval of the instructor.

**620. Systematic Botany. (2-6). Credit 4. II**

Survey of Angiosperms with emphasis on relationships. Biosystematics and modern taxonomy. Procedures in monograph preparation. Monographers. Field and herbarium techniques with problems designed for individual needs and interests. Prerequisite: Biology 619 or approval of the instructor.

**623. Plant Morphology. (2-6). Credit 4. II**

A study of the anatomical, reproductive, and organogenetic features of representative vascular plants; emphasis on economic forms. Prerequisite: Biology 327 or the equivalent.

**651. Mycology. (2-6). Credit 4. II**

Detailed studies of the fungi, with emphasis on life cycles of representative forms; genetics and cytology; principles of taxonomy; ecology and geographical distribution. Prerequisite: Biology 353 or approval of the instructor. (Offered in 1963-64 and in alternate years thereafter.)

## MICROBIOLOGY

**206. Introductory Microbiology. (2-4). Credit 3. I, II**

Relation of microorganisms to agriculture, industry, and health of man, animals, and plants. Prerequisites: Chemistry 102 or 104; 3 hours of biology.

**351. Fundamentals of Microbiology. (3-3). Credit 4. I**

Basic microbiology; comparative morphology, taxonomy, pathogenesis, ecology, variation, physiology of microorganisms. Required for students majoring in biology. Recommended for science majors. Prerequisites: Chemistry 227; 3 hours of biology; or approval of the instructor.

**438. Bacterial Physiology. (2-6). Credit 4. I**

A detailed study of the physiological activities of bacteria. Prerequisite: Biology 206. (Offered in 1964-65 and in alternate years thereafter.)

**457. Bacterial Ecology. (2-6). Credit 4. II** †

Relation of bacteria to their environment, especially to other microorganisms. Methods of isolation, identification, and differentiation. Prerequisite: Biology 206. (Offered in 1963-64 and in alternate years thereafter.)

**Biology 353. Mycology. (2-3). Credit 3. II** †

See page 281 for a full description of this course.

**Biology 661. Cellular Physiology. (2-3). Credit 3. I**

See page 280 for a full description of this course.

**Dairy Science 320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

See Department of Dairy Science for a full description of this course.

**Dairy Science 326. Food Bacteriology. (3-3). Credit 4. II** †

See Department of Dairy Science for a full description of this course.

**Veterinary Microbiology 301. Microorganisms in Animal Diseases. (1-4). Credit 2. I**

See Department of Veterinary Microbiology for a full description of this course.

## FOR GRADUATES

**635. Physiology of Microorganisms. (2-6). Credit 4. I**

An advanced consideration of the physiological activities of bacteria with special emphasis on metabolism. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1964-65 and in alternate years thereafter.)

**647. Industrial Microbiology. (2-6). Credit 4. II**

Microorganism as the basis of industrial processes. Practice includes antibiotic assay; analysis of products of metabolism, and fermentation balances. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1963-64 and in alternate years thereafter.)

**Biology 608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

See page 281 for a full description of this course.

**Biology 630. Protozoology. (3-3). Credit 4. II**

See page 284 for a full description of this course.

**Biology 651. Mycology. (2-6). Credit 4. II**

See page 281 for a full description of this course.

**Plant Physiology and Pathology 607. Physiology of the Fungi. (3-0). Credit 3. II**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

**Plant Physiology and Pathology 618. Bacterial Plant Diseases. (2-3). Credit 3. II**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

**Plant Physiology and Pathology 620. Plant Viruses. (2-0). Credit 2. I**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

## ZOOLOGY

**107. Vertebrate Zoology. (2-3). Credit 3. I, II**

Structure, physiology, and development of animals; emphasis on the biology of vertebrates.

**108. Invertebrate Zoology. (2-3). Credit 3. I, II**

Classification, comparison, anatomy, and physiology of invertebrate animals. Specimens from the more important invertebrate phyla are studied in the laboratory. Prerequisite: Biology 107 or approval of the instructor.

**217. Comparative Anatomy of Vertebrates. (2-4). Credit 3. I**

Comparative anatomy of the Prochordates and the lower vertebrates through Reptilia. Laboratory animals: Molgula, Dolichoglossus, Amphioxus, Squalus, Necturus, and Phrynosoma. Prerequisites: Biology 107, 108.

**218. Comparative Anatomy of Vertebrates. (2-4). Credit 3. II**

Comparative anatomy of birds and the mammals. Laboratory animals: the chicken and the cat. Prerequisite: Biology 217.

**219. Mammalian Anatomy. (2-3). Credit 3. I**

Principles of normal anatomy of cat and man. Nature and causes of mechanical injuries of man. Prerequisite: Biology 107.

**220. Physiology and Hygiene. (2-3). Credit 3. II**

A continuation of Biology 219. Normal and abnormal physiology of man. Prerequisite: Biology 219.

**325. Physical Anthropology. (3-0). Credit 3. II**

Man's relation to and position in the animal kingdom. Physical characteristics of mankind. Fossil and living types. Races and racial characteristics. Somatotypes. Prerequisite: Three hours of biological science.

**343. Histology. (2-3). Credit 3. I** †

Normal tissues of vertebrates including histogenesis of some. Histogenesis and organography of mammalian tissues reviewed. Prerequisite: Biology 217.

**344. Embryology. (2-3). Credit 3. II** †

Introduction to general and comparative vertebrate embryology; emphasis on early development of frog, chick, and pig. Prerequisite: Biology 217.

**422. Microtechnique. (1-6). Credit 3. II** †

Standard methods in the preparation of permanent microscopic slides of plant and animal tissues. Prerequisite: Twelve hours of biological science, including histology.

**433. General Physiology. (3-3). Credit 4. I** †

Fundamental physiology of protoplasm; basic processes and functions of organs and systems. Emphasis is placed on digestion, respiration, metabolism, excretion, muscular contraction, and reproduction. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

**434. Circulatory and Nerve Physiology. (2-3). Credit 3. II** †

Comparative functions of the circulatory, nervous system, and of the organs of special sense. Prerequisites: Biology 218; or Biology 107 and senior or graduate classification in an animal science.

**435. Advanced Invertebrate Zoology. (3-3). Credit 4. I** †

Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisite: Biology 107 or approval of the instructor.

**436. Animal Parasitology. (3-3). Credit 4. II** †

Study of parasitic worms and protozoa; laboratory methods in parasitology. Prerequisite: Biology 435 or equivalent.

## FOR GRADUATES

**603. Advanced Vertebrate Zoology. (1-5). Credit 3. II**

Phylogeny of vertebrates based on comparative anatomy, histology, embryology, and distribution. Prerequisites: Biology 218, 343, 344, or the equivalent.

**604. Advanced Embryology. (1-5). Credit 3. I**
Comparative and experimental studies of the mechanics of embryonic development. Prerequisites: Biology 218, 343, 344, or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**627. Helminthology. (3-3). Credit 4. I**
A study of the parasitic worms, especially Trematoda, Cestoda, Nematoda, and Acanthocephala. Prerequisite: Biology 436. (Offered in 1964-65 and in alternate years thereafter.)

**630. Protozoology. (3-3). Credit 4. I**
Morphology, taxonomy, physiology, reproduction, phylogeny, ecology, and life history of both free living and parasitic protozoa. May be taken concurrently with parasitology. Prerequisite: Biology 108. (Offered in 1963-64 and in alternate years thereafter.)

**632. Methods in General Physiology. (2-6). Credit 4. II**
Methods for the quantitative study of metabolism, respiration, circulation, excretion, movement, and other basic physiological phenomena. Recent advances in physiological methods to be presented on a seminar basis. Prerequisite: Biology 433 or the equivalent.

**649. Biology of the Endocrine Glands. (3-3). Credit 4. I**
A study of the structure, development, comparative anatomy, and physiology of the endocrine glands of the different animal groups. Prerequisites: Three hours of either anatomy or anatomy and physiology.

**653. Zoogeography. (3-0). Credit 3. II**
A study of the distribution of animals during geologic and present times; emphasis on the role of ecology and the effects of geography upon terrestrial and marine distribution. Prerequisite: Twelve hours of biological sciences, including at least 3 hours of advanced courses.

**656. Analytical Histology. (2-6). Credit 4. II**
Designed to acquaint the student with certain quantitative histochemical techniques in plant and animal science as applied to nucleoproteins, carbohydrates, lipids, and enzymes. Presentation of cytological evidences which aid in localizing the activities of nucleoproteins in cell metabolism. Prerequisites: Biology 343 or 453 or the equivalent; Chemistry 227.

## Division of Business Administration

Professor R. M. Stevenson,
Professors P. B. Goode, T. R. Hamilton, S. C. Hoyle, Jr.; Associate Professors R. L. Elkins, T. D. Letbetter, W. S. Manning, E. S. Packenham, J. E. Roche, N. A. Stewart, Jr., H. G. Thompson, Jr.; Assistant Professors R. D. Amason, R. T. Cherry, H. M. Courtney*, A. E. Crotty, J. H. Dozier, W. E. Eckles, W. C. House, Jr., D. C. Lowe, J. E. Oliver, R. A. Porter, Jr., J. L. Sandstedt, D. F. Simons, W. C. Tadlock, R. D. Thompson, J. V. VanIngen;
Instructors R. T. Ames, H. F. Lyles, W. L. Thornton

**105. Introduction to Business. (3-0). Credit 3. I, II, S**
Provides an over-all picture of business operations, develops a business vocabulary, and directs the thinking of each student to the field of business best suited to his interest and talent. Subject matter includes an analysis of the specialized fields within the business organization and of the role of business in modern society.

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*On leave of absence from 8-31-62 to 9-1-63.

**106. Business Organization. (3-0). Credit 3. I, II, S**

The relation of the manager to the organization; authority, delegation, responsibility; the span of management; functional analysis of organization and management; and organization for production, distribution, and finance. Prerequisite: Business Administration 105 or approval of the instructor.

**211. Business Law. (3-0). Credit 3. I, II, S**

Nature and scope of law; court system; homestead and exemption laws of Texas; law of contracts; principal and agent; business organizations, including partnerships and corporations; the Texas community property laws. Prerequisite: Sophomore classification.

**212. Business Law. (3-0). Credit 3. I, II, S**

Additional studies in the law of business, dealing with bailments, carriers, mortgages, suretyships, negotiable instruments, banks and banking, wills and estates, sales, bankruptcy. Prerequisite: Business Administration 211.

**227. Principles of Accounting. (3-3). Credit 4. I, II, S**

An introductory course designed to serve as a foundation for study of advanced accounting and to furnish a knowledge of accounting which will be of value to students in other fields. The subject matter includes: analysis and recording of business transactions; use of journal and ledger; trial balance and work sheet; adjusting and closing entries; accounting statements; payroll records and payroll taxes; introduction to partnership accounting; special journals and ledgers; business papers and business procedures related to accounting; voucher system.

**228. Principles of Accounting. (3-3). Credit 4. I, II, S**

A continuation of Business Administration 227. Internal control; partnership and corporation accounting; accounting for manufacturing concerns; analysis and interpretation of statements. Prerequisite: Business Administration 227.

**303. Statistical Method. (3-3). Credit 4. I, II, S**

Collection, tabulation, presentation, and analysis of data. A study of sampling, graphics, averages, ratios and coefficients, dispersion, skewness, probability and error, index numbers, seasonal and long-time trend, barometers, correlation. Prerequisite: Mathematics 102.

**304. Business Cycles and Business Measurements. (3-0). Credit 3. I, II, S**

An empirical and statistical study of economic fluctuations; theory, causes and control of business cycles; business barometers and forecasting. Study of economic and statistical services. Prerequisite: Business Administration 303.

**310. Credit Management. (3-0). Credit 3. II**

The elements of mercantile and consumer credit; organization of a credit department; sources of credit information; collection tools and procedures.

**314. Advertising. (3-0). Credit 3. I, II, S**

Place of advertising in business; advertising media, such as the newspaper, tradepaper, magazine, direct mail, poster, and the radio; description of the various methods of advertising; development of copy and layout of advertisements; consumer habits and psychology; methods of investigations for advertising campaigns; cost of advertising; legal and ethical problems involved in advertising; consideration of advertising from the standpoint of consumers. Prerequisite: Economics 203.

**315. Insurance. (3-0). Credit 3. I, II, S**

A general introductory course dealing with the theory and practice of insurance and its economic and social significance. A critical examination is made of the various types of life, fire, and automobile contracts available for protection against personal and business risks. In addition a brief study is made of state and federal insurance plans, suretyship, and other casualty and property coverages. Prerequisite: Sophomore classification.

**317. Punch Card Methods. (1-2). Credit 2. I, II**

Instruction and practice in the operation of punch card machines for the handling of accounting and statistical data. Prerequisites: Business Administration 228, 303.

**320. Life Insurance. (3-0). Credit 3. I**

This basic life insurance course presents the fundamentals of life insurance and annuities for the future life underwriter. The economic background of life insurance, and the various life insurance and annuity contracts are discussed relative to their utilization in private life and business. Included are fundamentals of rate-making, reserves, cash surrender values, dividends, and the selection of risks. Prerequisite: Business Administration 315.

**321. Marketing. (3-0). Credit 3. I, II, S**

A study of institutions, processes, and problems involved in transferring goods from producers to consumers, with emphasis on economic and social aspects.

**322. Property Insurance. (3-0). Credit 3. I**

A study of the principles and practices of property insurance designed for those who enter either the property and casualty insurance or property management fields. The course includes fire and allied lines contracts, consequential losses, protection of the mortgagee, transportation insurance (both ocean and inland), multiple line contracts, and rate-making. Prerequisite: Business Administration 315.

**324. Casualty Insurance and Suretyship. (3-0). Credit 3. II**

This course places emphasis upon the principles of casualty insurance and surety bonding. Employer's liability insurance is studied in conjunction with workmen's compensation insurance. The liability risks of business, professional, and personal activities are discussed. Theft, disability, aviation, glass, power plant, and credit insurance are discussed. Prerequisite: Business Administration 315.

**325. Retailing. (3-0). Credit 3. I, II, S**

Fundamental operations of retailing concerns and the need for effective coordination of retailing activities. Prerequisites: Business Administration 321; Economics 203, 204.

**327. Intermediate Accounting. (2-3). Credit 3. I, S**

Working papers and preparation of statements; correction of books and statements; special phases of corporation accounting; cash and receivables; inventories, investments. Prerequisite: Business Administration 228.

**328. Intermediate Accounting. (2-3). Credit 3. II, S**

Investments; tangible and intangible fixed assets; liabilities; reserves; statement analysis; statement of application of funds; cash-flow statement; statements from incomplete records; quasi-reorganizations, business combinations, divisive reorganizations; income tax allocation; price-level impact on financial statements. Prerequisite: Business Administration 327.

**329. Elementary Cost Accounting. (3-0). Credit 3. I, II, S**

Development of cost accounting principles relating to material, labor, and manufacturing expenses; basic cost accounting practices and procedures, with special emphasis on job order costing; survey of principles and practices of process cost accounting. Prerequisite: Business Administration 228.

**330. Advanced Accounting. (3-0). Credit 3. I, S** †

Special phases of partnership accounting; joint ventures; consignments; installment sales, accounting for insurance costs; statement of affairs and accounting for insolvent concerns; compound interest; home office and branch accounting. Prerequisite: Business Administration 328 or registration therein.

**332. Cost Accounting. (3-0). Credit 3. II, S**

Advanced process cost procedures, costing of joint and by-products, estimated cost, standard costs, managerial reports and analysis for cost control, direct costing, break-even analysis. Prerequisite: Business Administration 329.

**335. Administrative Accounting. (3-0). Credit 3. I, II, S**

Designed to acquaint the student with the uses of accounting data. It will include a study of the basic accounting concepts; the use of budgets; the analysis and interpretation of accounting reports; cost control, and methods of measuring performance. Not open to students majoring in accounting. Prerequisite: Business Administration 228.

**337. Data Processing. (2-2). Credit 3. I, II**

Use of electronic computers for recording and reporting, sorting; searching; collating; file maintenance; integrated data processing; coding of information; tables and approximations; storage of information; practical application. Prerequisite: Junior classification.

**341. Corporation Finance. (3-0). Credit 3. I, II, S** †

A survey of the principles underlying the financial practices and financial management of the modern business corporation. A study will be made of advantages and disadvantages of the corporation, sources of long-term and short-term credit, working capital, surplus and dividend policy, expansion and combination problems, and failure and reorganization. Prerequisite: Economics 203 or the equivalent.

**363. Principles of Management. (3-0). Credit 3. I, S**

An intensive study of the planning, organizing, motivating, and controlling functions in the process of modern business management. Emphasis is directed toward the development of a coordinated managerial philosophy in the realm of production, finance, and distribution. The analytical approach to the solution of business problems will be followed in this course. Prerequisite: Junior classification or approval of the instructor.

**403. Income Tax. (3-0). Credit 3. I, II** †

Income tax legislation; the present income tax law and regulations; treasury decisions, court decisions, and departmental rulings; income tax problems and returns. Prerequisite: Business Administration 327.

**406. Managerial Accounting. (3-0). Credit 3. II** †

A study of the uses of accounting information by management. Emphasis is placed on accounting procedures and reports essential to management. Cost analysis, cost control, budgeting and controllership. Prerequisite: Business Administration 329.

**407. Auditing. (3-0). Credit 3. I** †

Auditing procedures used by internal auditors and independent public accountants; preparation of working papers. Prerequisites: Business Administration 328, 329.

**408. Auditing. (3-0). Credit 3. II** †

A continuation of Business Administration 407. Work on an audit practice case with preparation of working papers and audit report, case studies involving auditing problems in special situations. (Required of students who plan to enter public accounting.) Prerequisite: Business Administration 407.

**409. Survey of Accounting Principles. (3-0). Credit 3. I, II, S** †

A survey of accounting designed for students majoring in engineering and architecture. The course provides for a survey of accounting procedures, basic elements of cost accounting, and the preparation and interpretation of financial statements. The course is not as comprehensive as Business Administration 227, 228, is not open to students in business administration, agricultural administration, or liberal arts. Prerequisite: Junior classification.

**416. Oil Production Accounting. (3-0). Credit 3. II**
A study of the systems and procedures for the acquisition of undeveloped oil properties, development of oil properties, and production of crude oil. Emphasis is placed upon the work in the accounting department of a crude oil producing company and the accounting treatment of intangible development costs, depletion allowance, and oil pipe line operations. Prerequisites: Business Administration 227, 228.

**419. Legal Principles Relating to Accounting. (3-0). Credit 3. I, S** †
An intensive study of legal principles emphasizing those which arise in the practice of accounting. Prerequisite: Senior classification.

**420. Principles of Investment. (3-0). Credit 3. I, II, S** †
An analysis of the character of various investment risks, comparison of investment media, and a study of the securities market. Theories and financial tools vital to decision making concerning the structure of the security portfolio and changes in that structure to adapt most advantageously to changing economic conditions and particular needs are investigated. Prerequisite: Business Administration 341.

**422. Personnel Problems of Industry. (3-0). Credit 3. I, II, S**
The relation of the worker to his employer, the methods of job finding, interviewing aids, occupational trends, scientific management, the functions and structure of personnel departments, employee welfare activities, and other problems of contemporary industrial development. Prerequisite: Junior classification.

**423. Human Relations in Business. (3-0). Credit 3. I, II, S**
Programs and agencies which workers and employers have developed to improve their economic and social status; job analysis, description, and classification; wage and salary problems and procedures; personnel records. Prerequisite: Business Administration 422.

**427. Insurance Law. (3-0). Credit 3. II**
Law cases on insurance to develop an understanding of the methods of administrative control by the state; typical clauses of insurance policies, and their interpretation by the courts; technical legal pitfalls; case examples from all forms of insurance coverage; Texas insurance law. Prerequisite: Business Administration 211.

**428. Real Estate Titles and Conveyances. (3-0). Credit 3. I, II, S** †
The ownership and transfer of titles to real property, including deeds, easements, urban and rural property with special attention to zoning, building codes, private restrictions and conditions. The law of fixtures, timber and crops, mortgages and liens, building contracts, plans and specifications, performance bonds, mines and minerals, contracts of sale, escrow and earnest money agreements, real estate brokers, sufficiency of property description, and other matters related to real property. Prerequisite: Business Administration 211.

**430. Cost Accounting Survey. (3-0). Credit 3. II, S** †
An introductory cost accounting course following Business Administration 409, for architects, engineers, and agricultural students. Purposes and uses of cost accounting; elements of cost; unit costs for use in bidding on contracts; comparison of cost procedures; job order and process costs, budgets, and standard costs; cost reports. Prerequisite: Business Administration 409.

**432. Security Analysis. (3-0). Credit 3. II** †
Methods of analyzing individual security issues, establishment of principles of selection and protection of security holdings, setting up sound and workable tests of safe investments, including financial statement analysis, understanding rights and interests of investors in senior securities and owners of common stock. Prerequisite: Business Administration 420.

**434. Problems in Finance. (3-0). Credit 3. II**

The course presents a series of comprehensive financial problems confronting the management of large and small businesses. The analysis and solution of the problems utilize the techniques and methods acquired in previous courses. The case system is used to give the student practice in linking up the related legal, accounting, and financial aspects of each situation. Prerequisite: Business Administration 341.

**435. Salesmanship. (3-0). Credit 3. I, II, S**

A consideration of the general principles of successful personal selling. Particular attention is given to personal requisites, qualifications, and training programs to enable the student to become a successful salesman. Prerequisites: Business Administration 321; Economics 203, 204.

**436. Sales Management. (3-0). Credit 3. II, S** †

A consideration of the problems confronting the modern sales executive; organization of sales departments, product research, selection and recruiting; compensation plans, routing, supervision, and costs connected with sales administration. Prerequisite: Business Administration 435 or 448.

**437. Applied Life Insurance. (3-0). Credit 3. II**

This course presents the legal and social aspects of life insurance. Problems of reinsurance, company organization, and financial position are examined within their regulatory framework. Consideration is given to all forms of government life insurance and the benefits under the Social Security Act. A study of the elements of programming and the fundamental uses of settlement options are included. Prerequisite: Business Administration 320.

**440. Real Estate Fundamentals. (3-0). Credit 3. I**

Basic factors and agencies which comprise the structure of our modern real estate development. A study of the historic, economic, legal, and financial aspects of realty and the effect of their interplay on the institution of real property, both urban and rural. Designed for the home and business property owner as well as for the professional real estate man.

**445. Marketing Research. (3-0). Credit 3. I** †

A study of the nature and uses of marketing research in business. Emphasis is on methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: Business Administration 303, 321.

**446. Marketing Industrial Products. (2-0). Credit 2. II**

Management aspects and economic factors affecting marketing policies are considered. Special emphasis is given to marketing research, marketing policies, channels of distribution, brand policy, pricing and control of marketing operations as they affect industrial products. A term project involving a report on the marketing of a specific industrial product is required of each student. Prerequisites: Business Administration 321, and Business Administration 303 or Mathematics 116.

**447. Advertising Procedures. (3-0). Credit 3. I**

Study of advertising procedures for newspapers, magazines, radio, and television. Specific topics include retail, mail order, national, and industrial advertising; advertising agencies; advertising research; and advertising campaigns. Prerequisite: Business Administration 314.

**448. Marketing Problems. (3-0). Credit 3. II** †

A study of the problems involved in the marketing of industrial and consumer goods; the problems connected with customer relations, channels of distribution, brands, sales promotion, pricing, and legislation. Prerequisites: Business Administration 321; Economics 203, 204.

**452. Veterinary Jurisprudence. (3-0). Credit 3. I, II**

A study of Texas statutes and court decisions regulating and affecting the practice of veterinary medicine. One of the primary functions of this course is to prepare the student for the State Board Examination in veterinary law. Prerequisite: Senior classification in the School of Veterinary Medicine.

**454. Law of Private Corporations. (3-0). Credit 3. I, II** †

Powers and limitations of the corporate form of business organization as distinguished from other forms of business enterprise. Legal problems encountered in formation, management, financing, and dissolution of corporations. Rights of corporate stockholders and creditors. Legislative control under state and federal statutes. Prerequisite: Business Administration 212.

**456. Applied Salesmanship. (0-2). Credit 1. II**

A practical course in personal salesmanship. Analysis of specific products; planning and execution of the interview; psychological aspects of selling. Particular stress is made on sales demonstration and the strategy involved in closing the sale. Prerequisites: Business Administration 435; English 403.

**459. Management Problems. (3-0). Credit 3. I, S** †

A case study approach to the solution of management problems dealing with effective use of personnel, materials, facilities, finances, methods, time, markets, and research. Prerequisite: Business Administration 363 or approval of the instructor.

**466. Management Policy. (3-0). Credit 3. II, S** †

Policy problems of the business organization. Designed to develop official thinking and provide training in writing and presenting oral solutions to problems requiring business decision making. Integrates the fields of marketing, finance, accounting, economics, law, and insurance into managerial concept of business decision making. Prerequisites: Senior classification; Business Administration 363 or approval of the instructor.

## FOR GRADUATES

**601. Statement Analysis. (3-0). Credit 3. II, S**

An analytical study of the different kinds of statements for the guidance of executives, investors, and creditors; balance sheet and profit and loss ratios. Prerequisite: Business Administration 327 or 430.

**602. Consolidated Statements. (2-0). Credit 2. II**

Consolidated balance sheets, consolidated income and surplus statements, holding companies, mergers. Prerequisite: Business Administration 330. (Offered in 1964-65 and in alternate years thereafter.)

**603. Price Analysis. (3-2). Credit 4. I, S**

Economic concepts relating to prices, statistical methods of analyzing prices, supply and demand curves, elasticity of demand, price forecasting, study and criticism of works on price analysis. Term paper required on factors affecting the price of a commodity. Prerequisites: Business Administration 303; Economics 203, 204.

**604. Statistics. (3-2). Credit 4. II, S**

Curve fitting and empirical formulas. Multiple correlation, mathematical and graphic. Sampling and measures of unreliability. Chi-square test. Analysis of variance and covariance. Prerequisites: Business Administration 303; Mathematics 102. Mathematics 110 is recommended.

**605. Accounting Problems. (3-0). Credit 3. I**

A study of advanced accounting theory and problems dealing primarily with corporation accounting, assets and liabilities, analysis of statements, and cost accounting. The problems considered will be the type currently stressed in accounting examinations. Prerequisite: Approval of instructor.

**606. Accounting Problems. (3-0). Credit 3. II**
A continuation of Business Administration 605. The topics will deal primarily with partnerships, fiduciaries, home office and branch, insurance, and auditing. Prerequisite: Approval of instructor.

**607. Market Analysis. (3-0). Credit 3. I**
A critical analysis of selected problems in the field of marketing. Each member of the class will be required to present a term report on some specific problem in the field of distribution. Prerequisites: Business Administration 303, 321.

**609. Management Seminar. (3-0). Credit 3. I, S**
A case study course covering the interrelated functions of production, distribution, and finance. Problems and situations confronting top and middle management are critically examined. Quantitative tools and techniques of accounting, statistics, and mathematics are employed to provide a framework for analysis and decision making. Prerequisite: Approval of instructor.

**612. Advanced Taxes. (2-0). Credit 2. II**
A study of special income tax problems of taxpayers; Federal estate and gift taxes; Texas inheritance tax; Texas franchise tax on corporations; claims for refund of taxes; preparation of protests to deficiency assessments; planning for tax savings. Prerequisite: Business Administration 403. (Offered in 1963-64 and in alternate years thereafter.)

**616. Governmental and Institutional Accounting. (3-0). Credit 3. I, S**
A study of the accounting principles and procedures peculiar to governmental units and institutions. Prerequisite: Business Administration 328. Economics 412 is recommended.

**620. Law and Business. (3-0). Credit 3. I**
Students write a paper on a topic of law in which they are interested, approved by instructor. Also, the following topics are covered: law and business, their relation to each other; present sources of law in Texas today; community property laws of Texas; collection of judgments in Texas; ad valorem taxes; automobile accidents and other topics relating to business. (Offered in 1964-65 and in alternate years thereafter.)

**622. Trade Regulations. (3-0). Credit 3. II, S**
Delineation of governmental control intended to promote free competition and curb its abuses. A study of the Federal anti-trust acts and their application by the courts; the Federal Trade Commission and its method of dealing with unauthorized business practices such as unfair competition, misleading advertising, price discrimination, and retail price maintenance. Prerequisite: Business Administration 211.

**630. Problems of Corporation Finance. (3-0). Credit 3. I**
The financial problems of the profit-seeking corporation are discussed from the viewpoint of the corporate financial officer. Consideration is given to such matters as current financing, financial aspects of promotion, refunding operations, dividend policies, and corporate reorganization. The course is designed to exercise the principles of corporation finance. Prerequisite: Business Administration 341. (Offered in 1964-65 and in alternate years thereafter.)

**631. Business Investigation and Analysis. (3-0). Credit 3. II**
The problems arising in the quantitative and qualitative analysis of railroad, public utility, and industrial securities are presented so as to train the advanced student of investments in the use of the tools of security analysis. The text material is supplemented by the consistent use of representative sources of investment information. Prerequisite: Business Administration 341. (Offered in 1963-64 and in alternate years thereafter.)

**634. Statistical Method Applied to Business Problems. (3-0). Credit 3. II**

The use of statistical methods applied to sales control, cost studies, personnel management, forecasting sales and production of an individual concern, and forecasting general business activity. Readings, reports, and problems. Prerequisites: Business Administration 303, 604. (Offered in 1964-65 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A critical examination of the subject matter presented in current periodicals, recent monographs and bulletins. Separate seminars will be conducted as required in fields such as accounting, finance, marketing, management, and statistics.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Directed study on selected problems not covered in the thesis research or in other courses. Prerequisites: Graduate classification; approval of instructor.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

## Department of Chemical Engineering

Professor J. D. Lindsay,
Professors W. D. Harris, C. D. Holland; Associate Professors W. B. Harris, W. W. Meinke; Assistant Professors R. R. Davison, L. D. Durbin, P. T. Eubank

**204. Elementary Chemical Engineering. (3-0). Credit 3. I, II**

An introduction to the fundamentals of chemical engineering which involves the solution of elementary problems on the application of mass balances, energy balances, equilibrium balances, rate of approach to equilibrium, and economic balances. Prerequisites: Chemistry 102 or 104; Mathematics 122 or 210 or registration therein.

**304. Unit Operations. (3-0). Credit 3. I, II** †

A study of fluid and heat flow, evaporation and drying. Prerequisite: Chemical Engineering 204.

**314. Unit Operations Laboratory. (0-3). Credit 1. II** †

Laboratory work based on Chemical Engineering 304. Prerequisite: Chemical Engineering 304.

**409. Oil and Gas Technology. (3-0). Credit 3. I** †

Application of the principles of chemical engineering to the treatment and processing of petroleum and its products. Emphasis is on unit operations. Prerequisite: Chemical Engineering 423.

**423. Unit Operations. (3-0). Credit 3. II, S** †

A continuation of Chemical Engineering 304 covering distillation, gas absorption, filtration, size reduction, separation, and mixing. Prerequisite: Chemical Engineering 304.

**424. Unit Operations. (3-0). Credit 3. I**

A continuation of Chemical Engineering 304 and 423, covering drying, crystallization, filtration, mixing, and conveying. Prerequisite: Chemical Engineering 423.

**426. Plant Design. (2-6). Credit 4. II** †

The solution of problems involved in the design and development of chemical engineering plants. These problems cover such factors as the capacity, selection, and location of equipment, reaction rates, economic balances, specifications, drawings, cost estimates, and plant location. Prerequisite: Chemical Engineering 424.

**428. Industrial Chemical Processes. (3-0). Credit 3. II**
A study of representative chemical manufacturing processes and their relationships. Prerequisite: Chemical Engineering 424.

**429. Oil and Gas Technology Laboratory. (0-3.) Credit 1. I** †
Laboratory work to accompany Chemical Engineering 409.

**433. Unit Operations Laboratory. (0-3). Credit 1. I** †
Laboratory work based on Chemical Engineering 423. Prerequisite: Chemical Engineering 314.

**454. Chemical Engineering Thermodynamics. (3-0). Credit 3. I** †
A study of the applications of thermodynamics to chemical engineering processes and operations. Prerequisites: Chemical Engineering 423; Chemistry 324.

**461. Process Control and Instrumentation. (2-0). Credit 2. I** †
A study of the fundamental principles and methods used in the measurement and control of the process variables such as pressure, temperature, and flow rate. Prerequisite: Chemical Engineering 423.

**464. Chemical Engineering Kinetics. (3-0). Credit 3. II** †
An introduction to the kinetics of reactions and the application of fundamental principles to the design and operation of commercial reactors. Prerequisites: Chemical Engineering 424, 454.

**481. Seminar. (1-0). Credit 1. I**
Oral discussion of selected topics from recent technical publications. Prerequisite: Senior classification.

**485. Advanced Problems in Chemical Engineering. Credit 1 to 5. I, II**
Special problems in chemical engineering are assigned to individual students or groups. The work may cover the numerous particular problems in chemical engineering processes or operations. It may be laboratory work or conference and discussion. Prerequisites: Chemical Engineering 423; approval of the Head of the Department.

## FOR GRADUATES

**605. Chemical Engineering Economics. (3-0). Credit 3. I**
Advanced calculations involving process design and process control as limited by least cost or maximum profit. Problems are based on the various unit operations and unit processes. Prerequisite: Chemical Engineering 423.

**606. Unit Operations. (3-0). Credit 3. II**
Applications of chemical engineering fundamentals in the manufacture of chemicals, refining petroleum, and other allied industries. Prerequisite: Chemical Engineering 423.

**607. Thermal Cracking. (3-0). Credit 3. I**
Application of fundamentals of chemical engineering to process calculation on thermal cracking. This includes process control and process design. Prerequisite: Chemical Engineering 606.

**608. Heat Transmission. (3-0). Credit 3. I**
Process and process design calculations on equipment involving the transfer of heat by conduction, convection, and radiation. Prerequisite: Chemical Engineering 423.

**611. Furnace Design. (3-0). Credit 3. II**
Process designs of furnaces. Involves radiant and convection heat transmission. Prerequisite: Chemical Engineering 608.

**612. Distillation. (3-0). Credit 3. I**

Process and process design calculations involving distillation of multicomponent and complex systems. Extractive and azeotropic distillation are covered. Prerequisite: Chemical Engineering 423.

**616. Estimation of Investment Cost. (2-0). Credit 2. II**

Simplified methods of estimating cost of process equipment in the preparation of preliminary appraisals. Prerequisite: Chemical Engineering 423.

**617. Unit Processes in Petroleum Refining. (4-0). Credit 4. I**

Calculations involving the effect of process variables on product yield and quality, rate of reaction, operating cost, and investment cost. Processes such as alkylation, isomerization, catalytic cracking, polymerization, thermal cracking, etc. will be covered. Prerequisites: Chemical Engineering 454, 616.

**618. Appraisal and Presentation of Chemical Engineering Data. (3-0). Credit 3. II**

Emphasis will be placed on analysis of experimental data. Practice is obtained by writing reports based on specific problems. Prerequisite: Chemical Engineering 423.

**619. Corrosion and Materials of Construction. (3-0). Credit 3. I**

The uses of materials of construction to preclude high corrosion rates in process equipment. Prerequisite: Chemical Engineering 423.

**623. Applications of Thermodynamics to Chemical Engineering. (3-0). Credit 3. II**

A study of the applications of thermodynamics to chemical engineering operations and processes. Prerequisite: Chemical Engineering 454.

**624. Chemical Engineering Kinetics I. (3-0). Credit 3. I**

A study of rates and mechanisms of chemical reactions. Thermal and catalytic reactions both homogeneous and heterogeneous are considered. Prerequisite: Chemical Engineering 423.

**625. Chemical Engineering Kinetics II. (3-0). Credit 3. II**

A study of the physical factors affecting chemical reaction rates and of methods for design of reacting equipment. Prerequisite: Chemical Engineering 624.

**626. Oil and Fat Technology. (3-0). Credit 3. I**

A study of the composition and properties of oils and fats, methods of extraction and purification, and their industrial utilization. Prerequisites: Chemical Engineering 423; Chemistry 228.

**627. Oil Mill Operation. (2-6). Credit 4. I**

A study of the theoretical and practical operating characteristics of the various units used in vegetable oil production. The economic factors of each unit and their over-all effect on plant operation will be covered. Prerequisite: Chemical Engineering 626 or registration therein.

**629. Transport Phenomena. (3-0). Credit 3. I**

The principles of transfer of momentum, energy, and mass will be studied by application to advanced chemical engineering problems. The theoretical analogy of these three modes of transfer will be emphasized. Prerequisites: Chemical Engineering 423, 454.

**661. Nuclear Chemical Engineering. (3-0). Credit 3. I**

This course has to do with the applications of chemical engineering to reactors and the utilization and disposal of residual products therefrom. It will cover such problems as materials of construction, corrosion, industrial utilization of reactors, the influence of radiation on materials, and the utilization of radiation from reactor residues to influence chemical reactions. Prerequisites: Mathematics 308; Physics 424.

**662. Nuclear Material Processing. (3-0). Credit 3. II**

This course has to do with the special applications of unit operations and unit processes to the handling of nuclear fuels and residual products from nuclear reactors. It will cover such topics as distillation, gaseous diffusion separation, liquid-liquid extraction, liquid-solid extraction, gas-solid extraction, ion-exchange, adsorption separations, benefication and metallurgcal processing. Prerequisites: Chemical Engineering 423; Mathematics 308.

**681. Seminar. (1-0). No credit. I, II**

Graduate students will be required to attend one hour per week to discuss problems of current importance in connection with their research.

**685. Problems. Credit 1 to 6. I, II, S**

Special work to suit individual or small group requirements. The work may cover the numerous particular problems in chemical engineering processes and operations. It may be laboratory work or conference and discussion. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Problems of unit operations and unit processes. For maximum credit comprehensive thesis must be prepared which is of sufficiently high calibre to permit a publication in the scientific and technical journals. Prerequisite: Approval of Head of Department.

## Department of Chemistry

Professor P. K. Calaway,
Professors J. K. Gladden, C. K. Hancock, A. F. Isbell, A. D. Suttle, Jr.*, R. N. Traxler, R. D. Whealy, B. J. Zwolinski; Associate Professors R. B. Alexander, J. B. Beckham, Alfred Danti, D. R. Lee, E. A. Meyers, J. O. Page, Henry Rakoff, N. C. Rose, Fred Sicilio, R. E. Snuggs, R. A. Zingaro; Assistant Professors R. M. Hedges, J. L. Jones; Instructors H. D. Bier, R. D. Poe, W. W. Spurlock

**101. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

**102. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental theories of structure and activity. Practical application of the more important chemical processes involving metals described. Organic chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

**103. Chemical Principles. (3-3). Credit 4. I**

A course in chemical principles and their application. For the student of superior aptitude and interest.

Laboratory work will provide study of experimental techniques and their application to chemical principles with more opportunity for individual experimentation. Prerequisites: This course is suggested for entering students with high scores on the algebra and chemistry placement examinations.

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*On leave of absence from 10-1-62 to 9-30-63.

**104. Chemical Principles. (3-3). Credit 4. II**

A continuation of Chemistry 103. Laboratory work consists mainly of semi-micro qualitative analysis with ample opportunity for individual experimentation. Prerequisite: Chemistry 103.

**106. General Chemistry. (3-3). Credit 4. II**

A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

**207. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

A considerable portion of the classroom time is devoted to chemical calculation involved in the practice.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. Prerequisite: Chemistry 102 or 104.

**223. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

Stress is placed on the basic principles and theories of quantitative analysis, both gravimetric and volumetric. The treatment is not highly mathematical. The laboratory work is designed to illustrate basic techniques. Not open to engineering students. Prerequisite: Chemistry 102 or 104.

**225. Elementary Organic Chemistry. (2-0). Credit 2. I**

A study of the hydrocarbons and their relation to the field of petroleum. Prerequisite: Chemistry 102 or 104.

**226. Chemical Calculations. (2-0). Credit 2. I**

An advanced review of the chemical calculations of general chemistry with special emphasis on stoichiometry and chemical equilibrium. Prerequisite: Chemistry 102 or 104.

**227. Organic Chemistry. (3-3). Credit 4. I, II, S**

An introduction to the chemistry of the compounds of carbon. A study of general principles and their application to various industrial processes.

The laboratory work serves as a basis of the course; the student here familiarizes himself with the reactions, properties, and relations of typical organic compounds. Prerequisite: Chemistry 102 or 104.

**228. Organic Chemistry. (3-3). Credit 4. I, II, S**

A continuation of Chemistry 227. Prerequisite: Chemistry 227.

**231. Elementary Organic Chemistry. (3-0). Credit 3. I, II, S**

A study of the aliphatic series of organic compounds including an introduction to the benzene series and to vitamins, proteins, and related substances. Applications are taken from the field of agriculture. Not open to engineering students. Prerequisite: Chemistry 102 or 104.

**316. Quantitative Analysis. (2-6). Credit 4. I, II, S**

An introduction to the methods of exact analysis as preliminary training for the more advanced courses. In the classroom the practice and theory of the laboratory exercises are dealt with by lectures and recitations. Special attention is given to stoichiometry.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. The work is first volumetric, then gravimetric. In the early periods samples of known composition and purity are analyzed. Prerequisite: Chemistry 102 or 104.

**317. Quantitative Analysis. (2-6). Credit 4. II** †

An introduction to the theory and practice of gravimetric, optical, and electrical methods of analysis. Prerequisite: Chemistry 316.

**323. Physical Chemistry. (3-3). Credit 4. I, II** †

Explanation and mathematical development of the theories and principles of chemistry. Topics discussed are atomic structure, gas laws, thermodynamics, thermochemistry, liquids, solutions, osmotic pressure, and colloids. Experiments in the laboratory substantiate the theories and principles developed in the classroom. Prerequisites: Chemistry 207 or 316; Mathematics 122 or 210.

**324. Physical Chemistry. (3-3). Credit 4. II, S** †

Intensive study of homogeneous and heterogeneous equilibria, the phase rule, chemical kinetics, catalysis, hydrogen-ion concentration, electrolytic and galvanic cells and electrochemistry, photochemistry, and radioactivity. Prerequisite: Chemistry 323.

**342. Physical Chemistry. (3-3). Credit 4. II** †

Explanation of basic chemical theories and principles with reference to their relationship to transformations in living matter. Special emphasis on such topics as atomic structure, diffusion and osmotic pressure, colloids, chemical equilibrium, catalysis, reaction velocity, hydrogen-ion concentration and its importance in biological processes. Prerequisites: Chemistry 207 or 316, and 227.

**344. Physical Chemistry. (3-0). Credit 3. I**

Structure of atoms, molecules, and crystals. Valence. Theories of polarity and ionization. Properties of gases, liquids, solids, and fugacities. Solubilities and properties of solutions. Study of colloids and surface energy. Equilibria. Electromotive force and oxidation potentials. Prerequisites: Chemistry 207; Mathematics 121 or 209; Physics 219.

**380. Chemical Bibliography. (1-0). Credit 1. II**

A study of the chemical library with instruction in the use of chemical journals, reference books, and other sources of information. Prerequisite: Junior classification.

**447. Qualitative Organic Analysis. (2-6). Credit 4. I** †

The identification of the principal classes of organic compounds. Prerequisite: Chemistry 228.

**461. Physical Chemistry. (3-0). Credit 3. I** †

This course covers those topics in undergraduate physical chemistry which are not covered in Chemistry 323 and 324. The course content includes surface phenomena, colloids, atomic structure, molecular structure and properties. Prerequisite: Chemistry 324.

**462. Inorganic Chemistry. (3-0). Credit 3. I** †

The periodic relationship of the elements, their compounds, principles of their bonding and applications. Prerequisite: Chemistry 324.

**463. Inorganic Chemistry. (2-3). Credit 3. II** †

A continuation of Chemistry 462. Laboratory work consists of preparation and analysis of inorganic compounds designed to introduce the student to basic preparative techniques. Prerequisite: Chemistry 462 or approval of instructor.

**464. Nuclear and Radiochemistry. (2-3). Credit 3. II** †

Chemical aspects associated with the production and application of nuclear energy; principles of separations and utilization of radioactivity and radiation. Less extensive than Chemistry 661. Prerequisites: Chemistry 317, 324 or approval of the instructor.

**481. Seminar. (1-0). Credit 1. II**

Oral discussion of selected topics from technical publications.

**485. Problems. Credit 1 to 4. I, II, S**
An introduction to research, library, and laboratory work. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**600. Survey of Chemistry. (2-3). Credit 3. S**
A survey course in chemistry designed for teachers of high school chemistry. Prerequisites: Graduate classification; approval of Heads of Departments of Chemistry and of Education and Psychology.

**607. Organic Techniques and Preparations. (1-6). Credit 3. II**
A study of laboratory operations theory and a description and comparison of equipment used in advanced work. Application of techniques of organic chemistry is made in the laboratory. Prerequisite: Chemistry 646 or registration therein.

**608. Qualitative Organic Analysis. (1-6). Credit 3. I**
Analysis of organic compounds. Prerequisite: Chemistry 228.

**609. Theory of Organic Chemistry. (3-0). Credit 3. II**
The development and application of chemical theories to organic compounds. Prerequisite: Chemistry 646.

**611. Principles of Physical Chemistry. (3-0). Credit 3. I**
A study of the general principles of chemistry from the quantitative standpoint. The course will include a discussion of gases, liquids, and solutions. Prerequisite: Graduate classification.

**620. Principles of Chemical Analysis. (3-0). Credit 3. II**
An advanced survey of the principles of chemical analysis with special emphasis on the newer developments in the field of analytical chemistry. Prerequisite: Chemistry 317.

**621. Chemical Kinetics. (3-0). Credit 3. I**
Study of some of the present theories about chemical reaction rates and mechanisms. Prerequisite: Chemistry 324.

**624. Physico-Organic Chemistry. (3-0). Credit 3. II**
Mathematical and quantitative investigation of organic chemical phenomena. Prerequisite: Chemistry 609 or approval of instructor.

**625. Petroleum Chemistry. (3-0). Credit 3. II**
Practical and theoretical consideration of chemical reactions of petroleum hydrocarbons. Prerequisites: Chemistry 228, 324. (Offered in 1963-64 and in alternate years thereafter.)

**626. Thermodynamics. (3-0). Credit 3. I**
Theory and applications of classical thermodynamic functions. Prerequisite: Chemistry 324.

**628. The Non-Metallic Elements. (3-0). Credit 3. I**
Study of the non-metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**630. The Metallic Elements. (3-0). Credit 3. I**
Study of the metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**631. Statistical Thermodynamics. (3-0). Credit 3. II**
An introduction to the methods of statistical mechanics based primarily on Boltzmann statistics. The approach to thermodynamics through the partition function. The statistical concept of entropy. Prerequisite: Chemistry 626.

**635. Heterocyclic Compounds. (3-0). Credit 3. I**
Structure, preparation, and properties of heterocyclic compounds with special emphasis on those with biological activity. Prerequisite: Chemistry 228. (Offered in 1964-65 and in alternate years thereafter.)

**636. Electrochemistry. (3-0). Credit 3. II**
Advanced treatment of conductivity, electrochemical thermodynamics, galvanic cells, electrodeposition, and corrosion. Prerequisite: Chemistry 324.

**639. Instrumental Methods of Analysis. (2-3). Credit 3. I**
A study of the theory and practice of modern techniques of chemical analysis and research. The laboratory work will illustrate the use of these instruments for routine analytical work and also their use as research tools. Prerequisite: Chemistry 317.

**641. Structural Inorganic Chemistry. (3-0). Credit 3. I**
Study of nuclear and extranuclear structure, isotopes, valency of the elements, and sterochemistry of inorganic compounds. Prerequisites: Chemistry 324, 462.

**642. Methods of Structural Chemistry. (3-0). Credit 3. II**
A study of theory, methods, and application of structural determination (arrangement and bonding) of chemical species. Prerequisite: Chemistry 641 or approval of the instructor. (Offered in 1963-64 and in alternate years thereafter.)

**643. Inorganic Complex Compounds. ( 3-0). Credit 3. II**
History, theories, and methods of investigations of inorganic complex compounds. Prerequisites: Chemistry 324, 462. (Offered in 1964-65 and in alternate years thereafter.)

**644. Quantitative Organic Analysis. (1-6). Credit 3. I**
Determinations: Macro Dumas, sulfur, Carius halogen, Micro residue, fractionation, Micro Dumas, catalytic hydrogenation, carbon and hydrogen, Micro Kjeldahl, Rast molecular weight, molar refraction, active hydrogen, alkaxyl, semi-micro saponification number. Prerequisites: Chemistry 228; reading knowledge of German.

**646. Organic Chemistry. (3-0). Credit 3. I**
A systematic and thorough presentation of organic chemistry on an advanced level. Prerequisite: Chemistry 228.

**648. Principles of Quantum Mechanics. (3-0). Credit 3. I**
A brief review of classical mechanics and the development of wave mechanics. The application of wave mechanics to some special chemical problems. Prerequisite: Approval of the instructor.

**661. Radiochemistry. (2-3). Credit 3. II**
A general course dealing with radioactive materials; their radiations; their preparation, purification, detection, identification, and their practical applications. Material on nuclear structures, nuclear transmutations, and radioactivity. Prerequisite: Chemistry 324 or 344.

**685. Problems. Credit 1 to 6. I, II, S**
This is a course in special topics to suit small group requirements. The work will deal with the more recent problems and results in the various branches of chemistry. It may be laboratory work or conference and discussion. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis or dissertation.

## Department of Civil Engineering

Professor S. R. Wright,
Professors J. B. Baty, F. J. Benson, S. J. Buchanan, H. L. Furr, B. M. Gallaway, E. L. Harrington, R. M. Holcomb*, T. R. Jones, Jr., C. J. Keese, J. A. Orr, C. H. Samson, Jr., J. H. Sorrels, R. N. Traxler; Associate Professors D. E. Cleveland, T. J. Hirsch, R. A. Jimenez, W. R. McCasland, R. E. Schiller, Jr., E. P. Segner, Jr., F. M. Smith; Assistant Professors W. A. Dunlap, R. M. Olson, Charles Pinnell**, N. J. Rowan, H. J. Sweet;
Instructors B. D. Franklin, R. P. Shubinski**

**201. Plane Surveying. (3-3). Credit 4. I, II**
Measurement of distances; use and care of surveying equipment; measurement of angles; land surveys and computations; stadia and plane table surveys; route surveys; horizontal and vertical curves; earthwork computations. Prerequisite: Mathematics 103.

**206. Plane Surveying. (0-3). Credit 1. I, II**
Fundamental principles of surveying; use of transit and level; boundary surveys, area computations, profile surveys. Prerequisite: Mathematics 103.

**208. Topographic Surveying. (1-3). Credit 2. I, II**
Fundamental principles of surveying; use of transit and level; special emphasis placed on use of plane table in topographic mapping. Prerequisite: Mathematics 103.

**300. Summer Surveying Practice. Credit 5. S**
Six weeks of surveying practice. Horizontal and vertical control; base line measurements; transit-stadia surveys; plane table surveys; boundary surveys; area and coordinate computation; polaris and solar observations; route surveys. Stream gauging. Prerequisite: Civil Engineering 201.

**305. Mechanics of Materials. (3-0). Credit 3. I, II, S**
Axial stresses and strains; stresses on various planes; properties of materials; stresses in thin-walled cylinders; torsional and flexural stresses and strains; shear and moment diagrams; equation of the elastic curve; moment area theorems; combined loadings; column behavior. Prerequisites: Mathematics 122 or 210; Mechanical Engineering 212 or the equivalent.

**306. Mechanics of Materials. (2-0). Credit 2. I, II, S**
Stresses and strains at a point including both analytical and graphical methods, theories of failures, fundamentals of riveted and welded joints, unsymmetrical bending, thick-walled cylinders, curved beams in flexure. Prerequisite: Civil Engineering 305.

**311. Hydraulics. (3-0). Credit 3. I, II**
The laws governing the action of water at rest and in motion, as related to engineering problems; the flow of water in pressure mains, sewers, aqueducts, open channels, and in rivers; measurement of the flow of water by nozzle, orifices, weirs and meters; flow of viscous fluids. Prerequisite: Mechanical Engineering 212 or equivalent.

**315. Strength of Materials Laboratory. (0-2). Credit 1. I, II**
Determination of the strength, ductility, modulus of elasticity, and other properties of engineering materials. Tests of timber, steel, cast iron, concrete, and reports showing results. Prerequisite: Civil Engineering 305 or registration therein.

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* On leave of absence from 6-1-61 to 8-31-63.
** On leave of absence from 9-1-62 to 5-31-63.

**336. Hydraulics Laboratory. (0-2). Credit 1. I, II**

Calibration of nozzles, orifices, water meters, weirs, pressure gauges; measurement of pipe friction; measurement of pipe flow with pitot instrument and Venturi meter; efficiency tests on impulse motor, hydraulic ram, and centrifugal pump; solution of assigned problems. Prerequisite: Civil Engineering 311 or registration therein.

**338. Hydraulics of Drainage Structures. (2-0). Credit 2. I, II**

The elementary study of rainfall and run-off and the hydraulics of culverts and drainage structures; flow in open channels. Prerequisite: Civil Engineering 311.

**344. Reinforced Concrete Structures. (3-3). Credit 4. I, II, S**

Analysis and design of reinforced concrete beams, columns, slabs, and footings using elastic and ultimate strength methods. Prerequisites: Civil Engineering 306, 345.

**345. Theory of Structures. (2-3). Credit 3. I, II, S**

Introduction to structural engineering; loads, reactions, and force systems; algebraic and graphical computations of reactions and forces in beams, three-hinged arches, and trussed structures used as roofs, floor systems, and bridges; moment area method applications, moment distribution method of analyzing statically indeterminate structures, forces and reactions in bents and portals, influence lines and criteria for moving loads. Prerequisite: Civil Engineering 306 or registration therein.

**346. Design of Members and Connections. (2-3). Credit 3. I, II, S**

The design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisites: Civil Engineering 306, 345.

**401. Water and Sewage Treatment. (2-2). Credit 3. I, II, S** †

Principles and methods of water purification and sewage treatment and disposal; laboratory demonstrations of control tests and correlation of results with treatment plant operation; interpretation of reports; inspections of local plants. Prerequisites: Chemistry 102 or 104; Civil Engineering 311.

**402. Water Supply and Sewerage Practice. (2-2). Credit 3. I, II** †

Development of sources of water supply; determination of the quantity of storm water and domestic sewage; short problems relating to water supply distribution systems, sewer systems, and the general features of water purification and sewage treatment plants; appurtenances and treatment plant equipment; local inspections of water supply and sewerage systems. Prerequisites: Civil Engineering 338, 401.

**403. Sanitary Design. (2-3). Credit 3. II** †

Practical problems in the design of sewer systems and appurtenances; sewage treatment plants; water collection and distribution systems; water purification plants. Prerequisite: Civil Engineering 402 or registration therein.

**406. Sanitation and Public Health. (3-0). Credit 3. I** †

Relation of sanitation to public health; residential water supply and excreta disposal methods; municipal sanitary work, including refuse disposal; plumbing; control of food supplies; mosquito, fly and rodent control; sanitation of swimming pools; industrial hygiene; organization of health departments. Prerequisite: Junior classification.

**407. Highway Engineering. (3-0). Credit 3. I, II, S** †

An introduction to problems in location, design, drainage, construction, and maintenance of highways, streets, and pavements. Road laws, finances, highway organizations and supervision briefly considered. The text is supplemented by lectures, the use of bulletins, models, and samples of materials. Prerequisites: Civil Engineering 300, 338, 465 or registration therein.

**408. Municipal Administration. (3-0). Credit 3. I** †
City government, including the city manager plan; relation of city to state; administration of city departments; public utilities; city planning. Prerequisite: Junior classification.

**417. Bituminous Materials. (2-3). Credit 3. II** †
Origin, production, specifications, and tests of bituminous materials and mixtures used in the construction and maintenance of roads and pavements. Prerequisites: Senior classification in engineering and Civil Engineering 407 or registration therein.

**435. Soil Engineering. (2-3). Credit 3. I** †
Problems encountered in the design and construction of earth dams and coffer dams; design of footings, drilled piers, and pile substructures; design and construction of embankments and subgrades for roads and airfields; seepage through earth masses. Prerequisites: Civil Engineering 465; senior classification.

**443. Materials of Construction. (1-3).* Credit 2.* I, II** †
Laboratory tests, supplemented with theory of portland cement, coarse and fine aggregates, concrete mixture design, air entrained and lightweight aggregate concrete. Prerequisite: Senior classification.

**448. Engineering Economy. (2-0). Credit 2. I, II** †
Analysis of operating costs of engineering projects including interest, depreciation, fixed costs, overhead. Comparison of first cost economy versus ultimate economy. Prerequisite: Junior classification in engineering.

**456. Highway Design. (2-3). Credit 3. II** †
Theory and practice in highway design. Highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements. Prerequisite: Civil Engineering 407.

**457. Traffic Engineering. (3-0). Credit 3. I, S** †
A study of vehicle operating characteristics, traffic flow, geometric design of roads, streets, and intersections, and methods of traffic control. Prerequisites: Civil Engineering 201, 407 or registration therein; Physics 219.

**458. Hydraulic Engineering. (3-0). Credit 3. II** †
Flow in pipes and complex pipe systems; non-uniform flow in open channels; pumping machinery; elementary hydraulic model theory. Prerequisite: Civil Engineering 338.

**463. Hydrology. (3-0). Credit 3. I** †
A study of the occurrences and measurements of precipitation and stream flow, relations between precipitation and run-off; estimating seepage; evaporation, run-off; surface, and flood discharges for drainage basins. Prerequisite: Civil Engineering 311.

**465. Soil Mechanics and Foundations. (2-2). Credit 3. I, II, S** †
An elementary introduction to soil mechanics and its application to the usual problems encountered in civil and architectural engineering. The origin, formation processes, and types of soils are reviewed. Methods of exploration and soil testing required for the design of various types of foundations, retaining walls, bridge abutments, coffer dams, earth dams, and other engineering structures. Prerequisites: Civil Engineering 305; Geology 320 or 422.

**470. Aerial Photogrammetry. (2-3). Credit 3. II** †
A study of photogrammetric optics, characteristics of aerial photographs, aerial cameras, map projections, ground control, radial plots, mosaics, interpretation of aerial photographs, stereoscopic plotting instruments, and mapping from oblique photographs. Prerequisite: Civil Engineering 201.

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*Becomes (2-3), credit 3, effective September 1, 1965.

**473. Cost Estimating. (3-0). Credit 3. I, II, S** †

Approximate and detailed estimates of the cost of construction projects including earthwork, foundations, concrete, masonry, steel, and miscellaneous items. Costs are developed to include materials, equipment, labor, overhead, and profit. Prerequisite: Senior classification.

**478. Construction Plant and Methods. (3-0). Credit 3. I, II** †

Plant and equipment selection for earthwork, foundations, concrete and structural steel, based on performance and economy. Construction schedules, progress reports, and performance records. Prerequisite: Senior classification in engineering or architecture.

**481. Seminar. (1-0). Credit 1. I, II** †

A study of the methods of job procurement subsequent to graduation including letters of application and job interviews; responsibilities and obligations of the young civil engineer; professional ethics; membership in professional societies, professional registration; lectures by staff and practicing engineers. Prerequisite: Senior classification.

**483. Analysis and Design of Structures. (2-3). Credit 3. I, II** †

The over-all procedure of analysis and design, including functions, loads, layouts of force systems, analysis, design drafting, specifications, cost comparisons, and maintenance as applied to typical simple bridge and building structures, design of plate girders, trusses, and reinforced concrete buildings. Prerequisites: Civil Engineering 344, 346, 465.

**486. Design of Prestressed Concrete Structures. (2-3). Credit 3. II** †

Basic theory. Properties of materials used. Stress losses. Prestressing systems. Design of determinate beams for flexure, shear, bond, and bearing. Deflections. Design of slabs and of continuous beams. Circular prestressing. Tension and compression members. Connections. Current specifications and economics of design. Prerequisite: Civil Engineering 483.

**Structural Mechanics 468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

See Structural Mechanics for a full description of this course.

**Structural Mechanics 469. Analysis of Structures. (2-3). Credit 3. II** †

See Structural Mechanics for a full description of this course.

## FOR GRADUATES

**601, 602. City Management. (4-0). Credit 4 each semester. I, II**

Development of European and American cities; forms of city government; functions of the city manager; administration of municipal affairs; organization of city departments; city finances; public utilities, fire prevention and protection, police administration; parks and playgrounds; public health and welfare; housing; city planning.

**603. Sewage Treatment and Stream Sanitation. (4-0). Credit 4. I**

Advanced studies of the theories of the various processes of sewage treatment, with special attention given to the details of the individual methods and units employed to effect these processes; and the requirements regarding the quality of sewage treatment plant effluents in relation to the sanitary protection of the receiving waters. Prerequisite: Civil Engineering 402.

**604. Water Quality and Treatment. (4-0). Credit 4. II**

Advanced studies of the characteristics of available sources of water, standards of quality of public water supplies, and the theories of treatment and purification processes, with special attention given to the details of the methods and units employed to effect these processes. Prerequisite: Civil Engineering 402.

**607, 608. Environmental Sanitation. (4-0). Credit 4 each semester. I, II**
Detailed study of environment and its relation to disease, covering malaria and its control; rodent control; sanitation of milk, shellfish, and other foods; collection and disposal of municipal refuse; sanitary aspects of air conditioning; housing sanitation, including plumbing and ratproofing; rural water supply and excreta disposal; sanitary inspection procedure.

**610. Industrial Wastes. (4-0). Credit 4. II**

Amount and characteristics of the common industrial wastes; their effects upon sewage treatment; methods of treatment. Prerequisite: Civil Engineering 401 or the equivalent.

**612. Transportation in City Planning. (2-0). Credit 2. I, S**

The importance and place of transportation in urban development and planning. The role of the engineer in planning. The relationship of transportation to planning studies, land use, zoning, planning legislation, and administration. Prerequisite: Graduate classification in the School of Engineering.

**615. Structural Design of Flexible Pavements. (2-0). Credit 2. I**

Characteristics of pavement loads, stress analysis in flexible pavements, design practices, construction and maintenance. Prerequisite: Civil Engineering 407.

**617. Traffic Engineering: Characteristics. (2-3). Credit 3. I**

Advanced theory and practice of engineering studies of traffic characteristics. Methods of traffic administration. Prerequisite: Civil Engineering 457.

**618. Traffic Engineering: Operations. (2-3). Credit 3. II**

Advanced theory and application of traffic control and design of traffic facilities. Traffic regulations. Prerequisites: Civil Engineering 457, 617.

**619. Highway Problems Analysis. (2-3). Credit 3. II**

The theory and application of advanced techniques in statistics, aerial photogrammetry, and data processing in the solution of problems in highway and traffic design and research. Students should have knowledge of computer programming and basic statistics. Prerequisites: Civil Engineering 617; Industrial Engineering 414.

**620. Structural Design of Rigid Pavements. (2-0). Credit 2. II**

Theory of rigid pavement design, design practices, maintenance, and construction. Prerequisite: Civil Engineering 407.

**621. Advanced Reinforced Concrete Design. (3-3). Credit 4. I**

Flat slabs, continuous building frames, torsion, deep beams, bulk storage structures, creep and temperature change effects. Prerequisite: Civil Engineering 344.

**622. Hydraulics of Drainage Structures. (2-3). Credit 3. II**

Hydraulics of open channels, bridge openings, culverts, head walls, surface street drainage, storm sewers, gutters, drop inlets and spillways. Theory of model studies as applied to drainage of highways, streets, and freeways. Prerequisite: Civil Engineering 338 or the equivalent.

**625. Geometric Design of Highways. (3-3). Credit 4. I**

The advanced theory and practice in highway design. Design controls and criteria, elements of design, design of alignment, cross-section, intersections and interchanges, multilane expressways, and drainage structures. Prerequisites: Civil Engineering 407, 465.

**627. Hydraulic Engineering. (3-3). Credit 4. I**

A study of precipitation, steam gaging methods, evaporation and transpiration, groundwater, hydrograph analysis, flood hydrographs from rainfall and snow, snow melt. Stream flow routing, frequency and duration. Studies, sedimentation, storage reservoir design, graphical correlation, airfield drainage.

**628. Hydraulic Engineering. (3-3). Credit 4. II**

A study of boundary layer theory, fluid flow in pipes, complex pipe networks, dimensional analysis, similitude and models, gradually and rapidly varied flow in open channels, backwater curves in natural streams, stilling basin design problems.

**629. Hydraulics of Open Channels. (3-3). Credit 4. I**

Advanced problems in uniform and non-uniform flow in open channels; the hydraulic jump; control section; backwater profiles.

**630. Ground Water Hydrology. (1-3). Credit 2. II**

A quantitative study of the application of the principles of hydrology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent, registration in 625.

**632. Advanced Design in Metals. (2-3). Credit 3. II**

Properties of high-strength and other special materials. Stress concentrations and fatigue. Ultimate strength. Reconsideration of selected specification rules in the light of theory, tests and new developments. Characteristics of thin gauge structures. Design of complex members and connections such as: curved columns, fixed bases, and rigid-frame knees. Prerequisites: Civil Engineering 483; Structural Mechanics 468.

**633. Advanced Mechanics of Materials. (4-0). Credit 4. II, S**

Review of stresses and strains at a point, torsion of non-circular cross sections, beams with combined axial and lateral loads, built-up columns, lateral buckling of beams, torsional buckling of centrally loaded columns, bending of thin plates and shells. This course is intended for students who do not intend doing further work in structural mechanics. Prerequisites: Aerospace Engineering 306 or Civil Engineering 306; Mathematics 308.

**634. Airfield Planning and Design. (2-0). Credit 2. II**

Study of regional planning, air traffic routing, landing requirements, methods for development of master plans for site selection, airfield design requirements involving layouts, pavement selection, and design. Review and application of criteria of design of drainage for all types of fields.

**636. City Street Design. (2-0). Credit 2. S**

Street classification and function. Design of city streets, intersections, access drives, and pavements. Street drainage. Financing city street improvements. Prerequisite: Civil Engineering 407.

**640. Freeway Design and Operation. (2-0). Credit 2. S**

Characteristics of traffic flow on controlled access facilities. Advanced theory and practice in operation on freeways and related street systems. Freeway traffic control. Material based on advanced research of the Texas Transportation Institute. Prerequisite: Civil Engineering 618.

**643. Plastic Analysis and Design in Steel. (2-3). Credit 3. I, S**

Principles and methods that are the basis for plastic analysis and design of steel frames. Static and mechanism methods of analysis of structures for ultimate load. Influence of shear and axial forces on plastic design. Effect of lateral buckling. Design of connections to provide plastic action. Design guides and specifications. Prerequisite: Graduate classification in civil engineering or approval of the instructor.

**649. Soil Mechanics. (3-3). Credit 4. I**

A study of foundation materials as they exist and of the various types of soils, their physical properties, testing procedure, and principles of classification. For advanced undergraduates and for graduate electives. Prerequisites: Civil Engineering 465; Geology 320.

**650. Soil Mechanics. (3-3). Credit 4. II**

A study of theory and practice in foundation explorations, laboratory investigations of undisturbed foundation samples, stress distribution through soils; problems in foundation design, correlation of settlement data from actual observations on the behavior of existing structures, stability of embankments, backfill pressures. Prerequisite: Civil Engineering 649.

**651. Advanced Theory and Application of Soil Mechanics. (3-3). Credit 4. I**

Special lectures, discussions and applications of theory to solution of major problems encountered in practice of soil engineering, embracing the fields of seepage, earth work design, foundation design, port structures, and special problems. Prerequisite: Civil Engineering 650.

**653. Flexible Materials of Construction. (2-3). Credit 3. I**

Theory supplemented with laboratory tests of bitumen, tars, and plastics. Stabilization of base and subgrade materials. Advanced mix design and evaluation of test methods; rheology and chemistry of asphalt. Prerequisite: Civil Engineering 417.

**654. Rigid Materials of Construction. (2-3). Credit 3. II**

A study of physical and chemical properties of rigid materials of construction; laboratory tests of different kinds of concrete, tests of metals and laminates; theory of corrosion of ferrous metal; corrosion mitigation; shrinkage and plastic flow of stressed concrete; design of concrete mixtures for resistance to alkali reactive aggregates, blasts from jet planes, salt water, and cavitation in hydraulic works. Prerequisite: Civil Engineering 443.

**656. Concrete Structures Testing Laboratory. (1-3). Credit 2. II**

Methods and equipment used in testing reinforced concrete structures and elements of structures. Planning of tests, and testing of various beams and columns. Observations of behavior in compression, flexure, shear, torsion, and combinations thereof. Correlations with theory, both elastic and plastic. Prerequisite: Civil Engineering 621.

**657. Dynamic Loads and Structural Behavior. (3-3). Credit 4. I**

The forces resulting from wind, other moving fluids, earthquakes, blasts, impact, moving loads, and machinery. The dynamic behavior of various structures and structural elements under the action of such loads. Self-induced vibration. Design to minimize and resist such forces. Prerequisites: Civil Engineering 483; Mechanical Engineering 459; Structural Mechanics 468.

**659. Structural Design. (3-3). Credit 4. II**

General theory and design procedures for thin-shell and folded-plate structures. Characteristics, use, construction, problems, and economic factors. Membrane theory for shells. Edge effects and effects of unsymmetrical loading. Design procedure for long, shallow, folded-plate structures. Approximate procedure for short, deep, folded-plate structures. Other special design problems. Prerequisite: Structural Mechanics 469 or the equivalent.

**664. Water Resources Development. (3-0). Credit 3. II**

Conservation and utilization of water resources with emphasis on the legal, social, and economic phases of watershed planning and multi-purpose projects. Prerequisites: Graduate classification; approval of the Head of the Department.

**666. Foundation Structures. (2-3). Credit 3. II**

The structural analysis and design of foundations. Spread footings, combined footings, and raft foundations. Retaining walls, piles, and pile foundations. Sheet-pile structures, cofferdams, wharves, and piers. Bridge piers and abutments. Prerequisites: Civil Engineering 465 or the equivalent; graduate classification in civil engineering.

**667. Highway Structures. (3-3). Credit 4. I**
The structural analysis and design of bridges, grade separation structures, retaining walls, and culverts. Review of functional and aesthetic requirements. Loads, materials, comparisons of different types, and economic proportions. Current standard, new developments, and current cost information. Prerequisites: Civil Engineering 483, 625.

**669. Bituminous Technology. (2-0). Credit 2. I, II**
A review will be made of the methods and techniques used in evaluating the chemical, physical, colloidal and rheological properties of asphaltic materials. The available data will be discussed and a study made of the methods for evaluating durability of asphalt. The original literature will be used for assigned reading. Prerequisite: Civil Engineering 417.

**670. Bituminous Technology. (2-0). Credit 2. I, II**
A study will be made of procedures used in selecting and processing crude oil for the manufacture of asphalt. The fundamental properties of asphaltic cutbacks, asphalt emulsions and mineral filled bitumens will be reviewed. The requirements of asphalts for use in roads, roofing and special applications will be studied. Original source material will be used. Prerequisites: Civil Engineering 417, 669.

**671. Urban Transportation Planning. (2-0). Credit 2. S**
The urban transportation problem. Techniques of estimating demand for traffic facilities. Special studies required in transportation planning. Prerequisite: Civil Engineering 617.

**672. Urban Transportation Planning. (2-0). Credit 2. S**
Problems of mass transportation. Study of the central business district, suburban shopping centers and terminal planning. Street and subdivision transportation system planning. Urban transportation economics, financing, and administration. Prerequisite: Civil Engineering 671.

**681. Seminar. (0-2). Credit 1. I, II, S**
Reports and discussion of current research and of selected published technical articles. May not be taken for credit more than once in a Master's degree program and twice in a Ph.D. program. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 6 each semester. I, II, S**
A course offered to enable majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by other courses in the established curriculum. Credit for this course normally will be limited to four credits per semester, but in exceptional circumstances, the Head of the Department may approve a maximum of six credits in one semester or summer term.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis or dissertation.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. I, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**

See Structural Mechanics for a full description of this course.

## Department of Dairy Science

Professor I. W. Rupel,
Professors R. E. Leighton*, A. V. Moore, Carl Vanderzant;
Associate Professors M. A. Brown, I. I. Peters

**202. Dairying. (2-2). Credit 3. I, II**

A survey of the dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. Food value of milk, tests for composition and quality, utilization and processing of market milk and dairy products. Prerequisite: Chemistry 101 or 103.

**301. Market Milk. (3-2). Credit 4. I** †

Nutritional value of milk; milk and public health; organization of city milk supplies; processing, distribution and inspection of market milk. Prerequisites: Biology 206; Dairy Science 202.

**303. Dairy Cattle Judging. (0-3). Credit 1. I**

Comparative judging of dairy cattle. Economic value of dairy type. Student contests and commercial judging techniques. Prerequisite: Dairy Science 202.

**307. Judging Dairy Products. (0-2). Credit 1. II**

Practice in judging and scoring dairy products according to consumer preference, established student contest, and commercial standards. Prerequisite: Dairy Science 202 or approval of the instructor.

**310. Advanced Dairy Cattle Judging. (0-2). Credit 1. II**

Advanced dairy cattle judging with particular attention to show ring type and breed registry association classification. Prerequisite: Dairy Science 303, or approval of the instructor.

**311. Technical Control of Dairy Products. (2-6). Credit 4. II** †

Methods of analysis of milk and milk products, and their use in controlling the composition and quality of dairy products. Prerequisites: Chemistry 223, 231; Dairy Science 301.

**316. Butter and Cheese Manufacture. (3-4). Credit 4. II** †

Processing procedures in the commercial manufacture of domestic and foreign cheeses; creamery butter manufacture. Prerequisites: Dairy Science 301, 320. (Offered in 1964-65 and in alternate years thereafter.)

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*On leave of absence from 9-1-61 to 8-31-63.

**320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

Relation of microorganisms to quality in milk and milk products; starter and fermented milk culture management; sanitary control on farms and in commercial dairies; standard analytical procedures according to the American Public Health Association. Prerequisite: Biology 206.

**324. Commercial Dairy Products. (3-0). Credit 3. II**

A modification of Dairy Science 316, 407, 415. Prerequisite: Dairy Science 202. (Offered in 1963-64 and in alternate years thereafter.)

**326. Food Bacteriology. (3-3). Credit 4. II** †

The microbiology of human foods and accessory substances. A study of raw and processed foods, emphasizing the physical, chemical, and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: Biology 206.

**407. Ice Cream Manufacturing. (2-3). Credit 3. II** †

The manufacture of ice cream, sherbets, and ices, and the physical and chemical principles involved; ice cream plant equipment; flavoring materials; merchandising. Prerequisite: Agricultural Engineering 213; Dairy Science 202.

**410. Dairy Plant Management. (1-2). Credit 2. II** †

Dairy plant operating efficiency. Special economy problems related to the handling of fluid milk, butter, cheese, and concentrated dairy products. Prerequisite: Senior classification in dairy science.

**415. Condensed and Powdered Milk. (2-2). Credit 3. I** †

The manufacture and distribution of condensed and evaporated milk, milk powder, milk sugar, casein, and other milk products. Prerequisites: Chemistry 231 or equivalent; Dairy Science 301; one semester of physics.

**416. Milk Secretion and Milking. (1-2). Credit 2. I** †

The physiology of lactation and the relationship between mechanical milking and the health and function of the bovine mammary gland. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 410; Biology 206.

**417. History and Development of Dairy Cattle. (2-2). Credit 3. I** †

The breeding and development of a dairy herd, including artificial breeding, selection of breeding animals, production testing and type classification, breeding programs, herd analysis, and a review of the development of the breeds. Prerequisites: Dairy Science 202; Genetics 301.

**418. Feeding and Management of Dairy Cattle. (3-2). Credit 4. II** †

The feeding, care, and management of the dairy herd; calf raising, developing the dairy heifer, care of dry and fresh cows, feeding for milk production, disease control, silage, buildings, and related topics. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 401; Dairy Science 202.

**420. Dairy Management. (1-2). Credit 2. II**

Feeding, care and management of dairy cattle, including herd improvement through breed selection, feeding for milk production, development of replacement stock and disease control. For agricultural education majors. Prerequisites: Animal Husbandry 303; Dairy Science 202; Genetics 301.

**481. Seminar. (1-0). Credit 1. I, II** †

A review of current dairy literature and presentation of papers on selected dairy topics. May be elected a second time for one additional credit. Prerequisite: Senior classification.

**485. Special Problems. Credit 1 to 4. I, II** †

Special problems in dairy production or dairy manufactures. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of Head of Department.

### FOR GRADUATES

**601, 602. Dairy Production. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy production, feeding, breeding, and management. Prerequisite: Dairy Science 418.

**603, 604. Dairy Manufactures. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy manufactures. Prerequisites: Dairy Science 316, 407, 415.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A study of research methods and a review of scientific literature dealing with individually selected problems in production or manufactures and not pertaining to thesis or dissertation. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research leading to thesis or dissertation in the respective fields of dairy production and dairy manufactures. Prerequisite: Graduate classification.

## Department of Economics

Professor A. F. Chalk,
Associate Professors I. O. Linger, H. R. Putnam; Assistant Professors
H. S. Bassett, C. A. Bitner, Jr., M. H. Butler,
L. H. Stern, J. J. Treacy

**203. Principles of Economics. (3-0). Credit 3. I, II, S**

An introductory survey course designed to acquaint the student with elementary principles of economics; the economic problem, the measurement and determination of national income, money and banking, and the theory of price. Prerequisite: Sophomore classification.

**204. Principles of Economics. (3-0). Credit 3. I, II, S**

A second course in elementary economics with primary emphasis upon analysis of economic aggregates, the theory of production and of the firm, international economic relations and labor problems. Prerequisite: Economics 203.

**311. Money and Banking. (3-0). Credit 3. I, II, S**

The fundamental principles of money, credit, and banking and their exemplification in modern currency and banking history, particularly that of the United States. Special attention is given to present-day conditions and problems. Prerequisites: Economics 203, 204.

**318. Economics of Labor. (3-0). Credit 3. I, II, S**

Special attention is given to the labor force, unemployment, labor markets, wages, work periods, the aged worker, industrial accidents, and phases of social security. Prerequisites: Economics 203, 204.

**319. Economic Development of the United States. (3-0). Credit 3. II**

A survey of the economic development of the United States from colonial times to the present. The course will describe the origin and development of our economic and social institutions and provide a basis for an understanding of our present economic problems. Prerequisite: Economics 203.

**320. Economic Development of Europe. (3-0). Credit 3. II**

A survey of the steps by which economic activities have evolved from the Medieval period into the complex capitalistic economy of today. Special emphasis on the development of the wage system, the Industrial Revolution, the expansion of markets, the ebb and flow of industrial activities, the financial structure, and the relation of industrial development to political policy. Prerequisite: Economics 203.

**321. International Trade and Finance. (3-0). Credit 3. I** †

A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisite: Economics 203.

**323. Economic Analysis. (3-0). Credit 3. I** †

The importance of prices in directing production and distributing income under both competitive and monopolistic market situations is considered, along with a survey of the effects of governmental policies on the pricing system. Prerequisites: Economics 203, 204.

**324. Comparative Economic Systems. (3-0). Credit 3. I**

A study of the economic systems of the leading nations. Prerequisite: Economics 203.

**330. Economic Development. (3-0). Credit 3. II**

Basic concepts and problems of economic development in underdeveloped countries. This course is designed for (1) foreign students, (2) students in technical programs planning for careers in foreign service, and (3) in-service training for technical assistance personnel. Prerequisite: Approval of Head of Department.

**410. Theory of Income and Employment. (3-0). Credit 3. I** †

Primary emphasis is given to the following topics: (1) conceptual problems of measuring national income; (2) organization of the national income accounts of the United States; and (3) determinants of the aggregate levels of income, employment, and prices. Prerequisite: Economics 311.

**412. Public Finance. (3-0). Credit 3. II** †

A survey of financial practices at the federal, state, and local levels of government. Current public problems and the theory of public finance are analyzed with the objective of determining appropriate changes in expenditure, tax, debt, and budget policies. Prerequisites: Economics 203, 204.

**424. Economics of Transportation. (3-0). Credit 3. II**

A description of the structure and functioning of our highway, rail, water, and air transportation systems; the economic significance of transportation in our society; and an analysis of the theory and practice of regulation of the transportation industries by the Interstate Commerce Commission and other governmental agencies. Prerequisite: Economics 203.

**435. Economics of Collective Bargaining. (3-0). Credit 3. I** †

Analysis of collective bargaining as an evolutionary process and the effect of negotiated wages and supplementary benefits upon labor mobility, productivity, managerial efficiency, and the economy as a whole. Prerequisite: Economics 318 or approval of the Head of the Department.

**437. Government and Labor Relations. (2-0). Credit 2. II**

A study of court decisions and laws regulating and protecting labor in the interest of national welfare with attention given to the social and economic environment in which such regulations were developed. Special attention is given to the major legislative acts of Congress and some of the state laws pertaining to labor relations, with some attempt to evaluate these in the light of a changing conception of labor relations. Prerequisite: Economics 318 or approval of the Head of the Department.

**443. Contemporary Economic Problems. (3-0). Credit 3. II** †

A study of current economic problems which lie within the following major areas of economic policy: economic stability, control of monopoly power, distribution of income, and international economic relations. Prerequisites: Economics 203, 204.

**481. Seminar. (1-0). Credit 1. II** †

Primarily for students majoring or minoring in economics. A study of methodology, scope, and philosophy of economic science, followed by individual investigation of some current economic problems. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. History of Economic Thought. (4-0). Credit 4. I**

Primary emphasis is given to the classical period of 1776-1848, although a brief survey of pre-classical economic thought is made at the beginning of the course. Students are expected to read extensively in original sources, and special attention is devoted to the works of Smith, Malthus, West, Ricardo, and Mill. Prerequisite: Approval of the Head of the Department.

**602. History of Economic Thought. (4-0). Credit 4. II**

Following a general survey of the wage-fund controversy, an intensive study is made of marginal utility theory as developed by Menger, Jevons, Boehm Bawerk, etc., followed by the neo-classical period. The final portion of the course is devoted to the synthesis of classical and marginal utility theory found in Marshall's system. Prerequisite: Approval of the Head of the Department.

**606. Economics of Labor. (4-0). Credit 4. II**

A survey of theories of the labor movement is followed by analysis of wage and employment theories, the effect of union policies and practices upon wages and employment, and the role of unionism in economic stability. Prerequisite: Economics 318.

**607. Contemporary Economic Theory. (4-0). Credit 4. II**

This is a survey of the more important contributions to economic thought which have been made during the last generation. The current writings of important contemporary economists are read and evaluated. Prerequisite: Economics 323.

**611. National Income Analysis. (4-0). Credit 4. I**

This course develops modern static national income analysis from a general equilibrium system. A survey is made of elementary dynamic national income analysis. The roles of fiscal and monetary policy in promoting economic stability are examined. Prerequisite: Economics 410 or approval of the Head of the Department.

**613. International Economic Policies. (3-0). Credit 3. II**

A critical examination of governmental policies toward international trade both at home and abroad; includes study of the role of the individual and the state in foreign trade; examines export and import controls, exchange control and exchange stabilization funds; considers tariff and rehabilitation policies of the government and their relation to foreign trade. Prerequisite: Economics 321.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual problems not related to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in economics; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research.

## Department of Education and Psychology

Associate Professor P. R. Hensarling;
Professors G. P. Parker, D. F. Parry, W. A. Varvel; Associate Professors
M. S. Kavanaugh, S. A. Kerley; Assistant Professors D. G. Barker,
A. J. Casey, L. H. Hope, Pat Sullivan; Instructor R. L. Provost

### EDUCATION

**215. Foundations of American Education. (3-0). Credit 3. I, II, S**
Facts and concepts essential for an understanding of American education. The course will present the sociological, historical, and philosophical development of education as a part of American culture and civilization.

**421. History and Philosophy of Education. (3-0). Credit 3. I, S** †
An evaluation of the educational achievements of the various nations and people of the western world; the development of the social, religious, political, and cultural beliefs and attitudes that underlie American education today. Prerequisite: Six hours of education.

**423. Principles and Practices of Teaching. (3-0). Credit 3. I, II, S**
Designed for teachers of secondary school subjects. Planning and directing learning activities; instructional media; classroom management; techniques of communication of subject matter; observation of public school classes; evaluation and marking. Prerequisites: Six semester hours of professional development courses; approval of the Head of the Department.

**425. Supervised Student Teaching. (2-12). Credit 6. I, II**
Observation and participation in classroom activities. Techniques of teaching the student's special subjects. Two hours per week devoted to student's problems. Preparation of units of work preparatory to teaching. Supervised teaching. Prerequisites: Senior classification; approval of the Head of the Department.

**426. Tests and Measurements. (3-0). Credit 3. II, S** †
The development of scientific measurement. The fundamental principles of sound measurement and an intensive study of the methods of appraising achievements of instructional objectives. Primary emphasis upon methods of constructing teacher-made objective tests and techniques for improving other types of written examinations.

**427. Principles of Guidance. (3-0). Credit 3. I, S** †
Introduction to the field of guidance and student personnel work. Treatment of principles underlying the aims, methods, and instruments employed in counseling and guidance. Attention to relationship of instruction and guidance. Prerequisite: Psychology 301 or a course in general psychology.

**436. Organization and Administration of the Elementary School. (3-0). Credit 3. S** †
The functional study of the participation in, and the organization and administration of the elementary school. Designed to meet the needs of elementary school principals, supervisors, teachers, and school superintendents. Prerequisites: Twelve hours of education.

**439. Educational Statistics. (3-0). Credit 3. I, S** †
Statistical techniques for classroom teachers, principals, students of psychology and education, and educational research workers. Problems originating in classrooms, offices of principals, laboratories of educational investigators will be used for illustrative materials and exercises. Not open to students who have received credit for any other course in statistics. Prerequisite: Six hours of advanced education.

**443. Elementary School Curriculum. (3-0). Credit 3. S** †

Curriculum problems as they relate to the growth, development, and adjustment of the child in the elementary school. Emphasis given to the study of curriculum materials and to the resource unit approach within the modified elementary curriculum structure. Prerequisite: A previous course in elementary school methods.

**444. Secondary School Curriculum. (3-0). Credit 3. I, S** †

Inquiry into current curriculum practices and their backgrounds, basis for curriculum reorganization, emphasis upon the resource unit approach within the modified curriculum structure.

## FOR GRADUATES

**601. College Teaching. (3-0). Credit 3. I, S**

Conceptions of higher education underlying typical programs including general education, the learning process, and effective use of techniques and instrumentalities of classroom instruction. Prerequisite: Graduate classification.

**606. Secondary School Administration and Supervision. (3-0). Credit 3. II, S**

The functional study of the participation in, and the organization and administration of, the secondary school. Administration and supervision of personnel. Pupil accounting. Observations and field studies. Designed to meet the needs of secondary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education.

**607. Programs and Procedures in Supervision. (3-0). Credit 3. II, S**

Designed for teachers, supervisors, and administrators. Deals with the philosophy, organization, and administration of supervision of both the elementary school and the secondary school. Prerequisites: Education 423, 444 or the equivalent.

**608. School Finance and Business Management. (3-0). Credit 3. II, S**

A study of school funds on the local, state, and federal level; budgeting, systems of accounting, and reporting. Supply management as related to school efficiency. Administration of special services, maintenance of buildings, grounds, and equipment.

**609. Public School Laws. (3-0). Credit 3. I, S**

A review of the constitutional provisions, statute laws, court decisions, and regulations governing the public schools, with special reference to Texas.

**613. The School Plant. (3-0). Credit 3. II, S**

A study of plans for determining the extent and character of present and future building and equipment needs of a school unit; efficiency of present plant; operation and maintenance; planning the building program.

**615. Structural Organization and Administration. (3-0). Credit 3. I, S**

A study of educational administration in the United States through an analysis of the nature of the educational function, consideration of the implications of democracy, and the legal relations of formal education to the democratic state. Emphasis will be given to the structural organization and administration of state and local school systems. Prerequisite: Graduate classification.

**616. Administration of Staff Personnel. (3-0). Credit 3. I, S**

A study of selection, salary schedules, tenure, and promotion of teachers, including in-service training; efficiency records and ratings.

**623. Standardized Tests and Measurements. (3-0). Credit 3. I, S**

Use of standardized tests in instruction and guidance. Study of various tests of achievement, aptitude, interest, and personality. Methods of construction, experimental trial, and standardization of published tests. Interpretation of test results. Prerequisite: Education 426 or 439, or the equivalent.

**624. Individual Testing. (2-3). Credit 3. I, S**

Practicum in administration and interpretation of Stanford-Binet and Wechsler-Bellevue intelligence tests. Introduction to individual tests of personality. Prerequisites: Education 426 or 439; 623 or registration therein.

**629. Practicum in Counseling and Guidance. (2-3). Credit 3. II**

Supervised practice in individual counseling and group guidance. Cases assigned in Counseling and Testing Center and local public schools. Prerequisites: Education 624, 631.

**631. Techniques of Counseling. (3-0). Credit 3. II**

Methods of gathering, analyzing, and interpreting case data in counseling. Analysis of dynamics of counselor-counselee relationship. Interviewing techniques. Use of test results in counseling. Prerequisites: Education 427 or 635, 623; Psychology 634.

**632. Educational and Occupational Information. (3-0). Credit 3. I, S**

Sources, classification, and analysis of educational and occupational information. Occupational trends, local occupational surveys. The use of occupational information by the classroom teacher and the guidance specialist.

**633. Methods of Group Guidance. (3-0). Credit 3. I, S**

Methods and practices in group guidance. The homeroom, classroom, and school clubs as opportunities for guidance. Prerequisite: Education 427 or 635.

**635. Organization and Administration of Pupil Personnel Services. (3-0). Credit 3. I, S**

A course for administrators, counselors, supervisors, and teachers designed to help them develop an understanding of the role of pupil personnel services; responsibility for the techniques of evaluating the program of pupil personnel services. Prerequisite: Graduate classification.

**637. Advanced Elementary School Methods. (3-0). Credit 3. S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the elementary school level. Prerequisite: Twelve hours in elementary education or an elementary school certificate.

**638. Advanced Secondary School Methods. (3-0). Credit 3. II, S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the secondary school level. Prerequisite: Twelve hours of secondary education or a secondary school certificate.

**639. Processes in Educational Leadership. (3-0). Credit 3. II, S**

An analysis of the skills and techniques of the administrator in the modern school, with emphasis on democratic leadership, teacher-administrator relationships, group processes, and evaluation of the administrative programs. Prerequisite: Twelve hours of advanced education.

**640. School-Community Relationships. (3-0). Credit 3. II, S**

Considers the total educational and social patterns of living which exist in any community. The home, the school, the church, clubs, recreation centers, and all agencies of the community are conceived collectively as dominating educational influences in the life of the child. Prerequisites: Twelve hours of advanced education; graduate classification.

**646. Internship for the School Principal. (0-9). Credit 3. I, II**

Designed to give the prospective school principal on-the-job training under the guidance of a successful, experienced, practicing public school administrator and supervision of a member of the College staff. A certification requirement for the principalship unless waived by the Head of the Department. Prerequisites: Master's degree; approval of the Head of the Department.

**647. Internship for the School Superintendent. (0-9). Credit 3. I, II**

Designed to give the prospective school superintendent on-the-job training under the guidance of a successful, experienced, practicing public school superintendent and supervision of a member of the College staff. A certification requirement for the superintendency unless waived by the Head of the Department. Prerequisites: Master's degree; approval of the Head of the Department.

**648. Internship for the School Business Administrator. (0-9) Credit 3. I, II**

The internship is designed to give the prospective school business administrator on-the-job training under the guidance of a successful, experienced, practicing public school administrator and the supervision of members of the College staff. May apply to certification requirements for the school business administrator. Prerequisites: Eighteen semester hours of graduate credit; approval of the Head of the Department.

**651. Orientation in Business Principles and Procedures. (3-0). Credit 3. I, S**

Interdisciplinary survey course which utilizes various fields in business to broaden the knowledge of the school superintendent and the school business official; contemporary economic theory, business cycles, business operation, insurance, tax structures, modern accounting systems, real estate, finance, price analysis and statistical methods applied to business problems. Case studies. Field studies. Prerequisite: Master's degree or approval of the Head of the Department.

**652. Educational-Governmental Relationships. (3-0). Credit 3. II, S**

Interdisciplinary survey course which utilizes various fields in political science, comparative government, American and state history. A current analysis of the inter-relationships of educational administration to local, county, state, national, and international political organizations. Prerequisites: Master's degree; approval of the Head of the Department.

**653. The Nature and Problems of Administrative Behavior. (3-0). Credit 3. I, S**

Interdisciplinary survey course which utilizes the case study method. Designed to enhance understanding and improve techniques in decision making, communication and personnel relations. Emphasis is placed upon use of resource persons in the social sciences and upon field studies, problems, and experiences. Prerequisites: Master's degree; approval of the Head of the Department.

**681. Seminar. (1-0). Credit 1. I, S**

Problems pertinent to the superintendent, principal, counselor, supervisor, and visiting teacher are selected. Recent developments and research in the different areas will be presented. Prerequisites: Eighteen hours of advanced education; approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of education. Prerequisite: Graduate classification in education.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

## PSYCHOLOGY

**207. General Psychology. (3-0). Credit 3. I, II, S**

An introductory course dealing with the elementary principles of human behavior. Designed especially for those students majoring in the social or biological sciences, in pre-medicine, or in education. Credit cannot be obtained for both Psychology 207 and 303.

**301. Educational Psychology. (3-0). Credit 3. I, II, S**

The application of psychology to the problems of teaching. The nature and operation of the laws of learning; transfer of training; nature, measurement, and significance of individual difference; conditions that influence efficiency of learning.

**302. Psychology for Secondary School Teachers. (3-0). Credit 3. I, II, S**

A basic course in educational psychology with special consideration given to guiding the development and learning of adolescents. Not available to students with credit for Psychology 301 or Psychology 323. Satisfies psychology requirements of the eighteen-hour minimum certification program.

**303. Psychology for Technical Students. (3-0). Credit 3. I, II, S**

An introductory course emphasizing the applications of general psychology. Designed for students in agriculture, business administration, and engineering. Credit cannot be obtained for both Psychology 207 and 303.

**305. Personality Adjustments. (3-0). Credit 3. I**

Emphasis upon adjustment problems of normal people. Principles of mental hygiene in relation to family, school, and community life. Prerequisite: Psychology 207, or 301, or 303.

**307. Child Growth and Development. (3-0). Credit 3. II**

Growth and development of the normal child from infancy to adolescence with emphasis upon the elementary school years. Prerequisite: Psychology 207, or 301, or 303.

**309. Differential Psychology. (3-0). Credit 3. I**

Individual and group differences essential to the evaluation of test results and behavior. Distribution and extent, causative factors, trait organization. Prerequisite: Psychology 207 or 303 or advanced standing in engineering.

**323. Psychology of Adolescence. (3-0). Credit 3. I, II, S**

The psychological problems of the normal teen-age individual, including the consideration of the ways and means of aiding youth to meet these problems constructively. Prerequisite: Psychology 207, or 301, or 303.

**401. Industrial Psychology. (3-0). Credit 3. I, II, S**

Significance of individual differences in industry; instruments and techniques of selecting and placing personnel; motivating, training, and supervising the worker; nature and control of fatigue; psychological aspects of labor relations; morale and attitude measurement; industrial counseling. Prerequisite: Psychology 207, or 303, or advanced standing in industrial engineering or industrial technology.

**403. Dynamics of Human Behavior. (3-0). Credit 3. II** †

The motivation of behavior and the mechanisms of adjustment to conflict. Types of maladjustment and their causation. The development and integration of the personality. Theories of personality. Prerequisites: Psychology 207 or 301 or 303, and 305 or graduate classification in education or sociology.

**406. Psychology of Learning. (3-0). Credit 3. II**

A survey of the significant concepts, experimental methods, and principles of learning. Prerequisite: Psychology 207 or 301 or 303.

**408. Experimental Psychology. (2-3). Credit 3. II**

Applications of experimental method to psychology. Principles and techniques in areas of reaction time, simple motor phenomena, sensation, perception, learning, and social interaction. Prerequisite: Psychology 406 or advanced standing in industrial engineering.

### FOR GRADUATES

**634. Principles of Human Development. (3-0). Credit 3. I, S**

Biological, psychological, and cultural interrelationships in human development. Emphasis upon principles and methods as illustrated in research and theoretical contributions. Experiences in procedures of child study. Prerequisite: Graduate classification.

## Department of Electrical Engineering

Professor G. D. Hallmark,
Professors H. C. Dillingham, J. P. German, L. M. Haupt, Jr.; Associate Professors B. J. Ball, J. S. Denison, A. J. Druce, M. G. Rekoff, Jr.; Assistant Professors H. M. Barnard*, J. B. Jones, E. N. Roots, Jr.; Instructors W. L. Green, N. W. Hass, R. D. Meeks, J. W. Rogers, W. P. Worley

**201. Electricity and Magnetism. (3-4). Credit 4. I, II, S**

Lectures, recitations, and problems in electricity and magnetism.

A laboratory investigation of the phenomena studied in the textbook. Prerequisite: Mathematics 121 or 209.

**214. Electrical Circuit Theory. (3-3). Credit 4. I, II, S**

An introduction to electrical circuit theory. Complex numbers, phasor algebra, and response of single mesh and series-parallel circuits. Resonance phenomena and the poles and zeroes of impedance and admittance are defined. Prerequisites: Electrical Engineering 201; registration in Mathematics 307.

**305. Electrical Circuits and Machines. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of electrical circuits, including fundamental electronic circuits, machines, and control devices. The practice is designed to familiarize the general engineering student with test procedures for and characteristics of both direct and alternating current machines. Prerequisites: Mathematics 122 or 210; Physics 219.

**307. Electrical Circuits. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of direct and alternating current circuits, magnetic circuits, and transformers.

The practice includes measurement of circuit phenomena. Prerequisites: Mathematics 122 or 210; Physics 219.

**308. Electrical Machinery. (2-3). Credit 3. I, II, S**

A study of the principal types of electrical machines and servomechanisms, including their characteristics, applications, and control devices.

The practice includes actual operation and testing of electrical machinery and equipment most commonly used in industry. Prerequisite: Electrical Engineering 307.

**322. Electric and Magnetic Fields. (3-0). Credit 3. II, S**

Application of vector analysis to the theory of electric and magnetic fields. Maxwell's equations are used to study the propagation and reflection of electromagnetic waves. Prerequisites: Electrical Engineering 214; Mathematics 308 or registration therein.

**323. Electrical Circuit Theory. (3-0). Credit 3. I, II**

General circuit analysis and theorems for lumped constant, passive circuits. Steady state and transient response is studied by classical methods and by the behavior of impedance and admittance functions in the complex frequency plane. Prerequisites: Electrical Engineering 214; registration in Mathematics 308.

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*On leave of absence from 9-1-62 to 8-31-63.

**324. Electrical Circuit Theory. (3-0). Credit 3. II, S**

A continuation of the study of lumped constant passive circuits, including transform methods of analysis, two terminal pair networks and three-phase circuits. Prerequisites: Electrical Engineering 323; Mathematics 308.

**325. Electronics. (3-0). Credit 3. I, II**

An introduction to the theory of electron tubes and transistors. Thermionic, gaseous, light sensitive, and cathode ray tubes; solid state devices, rectifier circuits and amplifier equivalent circuits will be covered. Prerequisites: Electrical Engineering 214, registration in 323.

**326. Electronic Circuits. (3-0). Credit 3. II, S**

A study of the basic circuits used in radio, television, and computers. An analytical study of modulators, demodulators, oscillators, and amplifiers. Prerequisites: Electrical Engineering 325, registration in 324.

**327. Electrical Laboratory. (1-3). Credit 2. I, II**

Studies of the precision and accuracy of measurement. Electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 323, 325 or registration therein.

**328. Electrical Laboratory. (1-3). Credit 2. II, S**

Studies of the precision and accuracy of measurement, electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 322, 324, 326 or registration in these courses.

**330. Electrical Machinery. (3-0). Credit 3. I, II, S**

An introduction to energy conversion concepts and devices with detailed study of DC machines. Prerequisites: Electrical Engineering 324, 328 or registration therein.

**331. Theory and Application of Electron Tubes. (3-3). Credit 4. I, S** †

For students other than electrical engineering majors. A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. Prerequisite: Electrical Engineering 307.

**401. Electrical Machinery. (3-0). Credit 3. I** †

A graphical and mathematical study of electrical machines, including transformers. Prerequisites: Electrical Engineering 330, registration in 403; Mathematics 308.

**402. Electrical Machinery. (3-0). Credit 3. II** †

A continuation of the study of synchronous machines; asynchronous machines, polyphase and single phase motors; rectifiers and converters and control equipment. Prerequisites: Electrical Engineering 401, 403.

**403. Electrical Laboratory. (0-6). Credit 2. I**

A laboratory study of the electrical machines covered in Electrical Engineering 401. Prerequisites: Electrical Engineering 324, 328, registration in 401.

**404. Electrical Laboratory. (0-6). Credit 2. II** †

A continuation of the laboratory study of electrical machines covered in Electrical Engineering 401, 402. Prerequisites: Electrical Engineering 401, 403, 439.

**415. Transmission Networks. (2-2). Credit 3. I** †

An analytical study of the theory of transmission lines and impedance matching devices. Hyperbolic-function treatment is generalized to apply to power, electronic, and communication circuits. The laboratory will consist of group problems and demonstrations. Prerequisites: Electrical Engineering 324; Mathematics 308.

**420. Servomechanisms and Control Devices. (3-0). Credit 3. II** †

A general study of closed-loop control devices, including electrical, hydraulic and mechanical systems. Prerequisites: Electrical Engineering 307 or 323; Mathematics 308.

**428. Communications Circuits. (2-3). Credit 3. I** †

A study of the engineering principles used in wire line communications, including telephone and telegraph systems, transmission theory, inductive interference, networks, filters, loading, repeater and carrier systems. Laboratory investigations include transmission measurements on artificial lines involving the use of vacuum tube measuring devices and impedance bridges. Prerequisite: Electrical Engineering 415 or registration therein.

**432. Economic Phases of Engineering. (2-0). Credit 2. II**

Problems in the mathematics of finance, depreciation, engineering economy, accounting, distribution factors, and rates with particular reference to the electric power industry. Prerequisite: Electrical Engineering 401.

**439. Electronic Systems. (3-0). Credit 3. I, II**

A study of the application of devices and circuits to complete systems in the field of communication, instrumentation, and control. Prerequisites: Electrical Engineering 324, 326, 328.

**451. Applied Electromagnetic Theory. (3-0). Credit 3. I** †

Static boundary value problems; conformal transformation; the Schwartz transformation; rectangular harmonics; cylindrical harmonics; Bessel functions; mathematics of Bessel functions; spherical harmonics; Legendre polynominals; applications of Maxwell's equations to plane waves in dielectrics and conductors; Maxwell's equations applied to antennas; radiation; fields and power calculations; antenna impedances. Prerequisites: Electrical Engineering 322; Mathematics 308.

**452. Ultra High Frequency Techniques. (2-3). Credit 3. II** †

An introduction to the theory and practice of ultra high frequency radio wave generation, transmission, and radiation. Development of Maxwell's equations and their application to transmission of electrical energy in wave guides. Prerequisites: Electrical Engineering 322, 326.

**454. Advanced Electronic Circuits. (3-3). Credit 4. II** †

A study of the electronic circuits used for pulsing, counting, computing, and regulating and as wide band amplifiers. Transistor and tube elements will be considered. The laboratory will consist of measurements on typical devices. Prerequisite: Electrical Engineering 326.

**456. Communication Theory. (3-0). Credit 3. II** †

Introduction to the processing and transmission of information with emphasis on the mathematics and block diagrams of systems. Includes elements of information theory, effects of signal-noise ratio, methods of modulation and demodulation. Prerequisite: Electrical Engineering 454 or registration therein.

**457. Principles of Electronic Computers. (3-3). Credit 4. II** †

Organization and internal operation of analog and digital computers; function integration, addition, multiplication, and generation; analog system simulation; switching networks; Boolean algebra applied to digital computer components; analysis and synthesis of sequential devices, digital computer memories, input and output devices; the arithmetic unit. Prerequisite: Electrical Engineering 326 or registration therein.

**459. Electric Power Systems I. (2-2). Credit 3. I**

General considerations in the transmission and distribution of electrical energy as related to power systems. Calculation of electric transmission live constants and load flow studies. General theory of symmetrical components. Prerequisite: Electrical Engineering 324.

**460. Electric Power Systems II. (2-2). Credit 3. II**

Study of electric power systems during fault conditions by applications of the method of symmetrical components. Power system transient stability studies. Economic system loading and automatic load flow control. Prerequisite: Electrical Engineering 459.

**485. Problems. Credit 1 to 3 each semester. I, II**

Research and design problems of limited scope approved on an individual basis intended to promote independent study. The results of the study will be presented in writing, and an oral presentation to the staff and students will be required. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**601.* Advanced Alternating Currents. (3-4). Credit 4. I, S**

Wave analysis; mechanical and electrical wave analyzers; non-linear circuits; multiple winding transformer theory; transient solution of general network. The study of transients with oscillographs.

**602.* Advanced Alternating Currents. (3-4). Credit 4. II**

Steady-state and transient solution of recurrent networks, operational calculus methods of solution of circuits with lumped and distributed constants, non-linear circuits.

**605.* Linear Servomechanisms. (3-3). Credit 4. I**

A continuation of Electrical Engineering 420 to include advance topics which will extend the study of analytic methods as applied to linear systems and introduce concepts related to linear systems synthesis. Prerequisite: Electrical Engineering 420.

**606. Non-Linear Servomechanisms. (3-0). Credit 3. II**

A study of techniques available to analyze non-linear systems and discontinuous systems, and a study of associated synthesis procedures. Prerequisites: Electrical Engineering 605; Mathematics 617.

**607. Alternating Current Circuits and Machines. (3-4). Credit 4. I**

The study of transient conditions in electrical machines.

**611. Symmetrical Components Applied to Electrical Engineering. (3-4). Credit 4. I**

The solution of unbalanced electrical circuits by means of symmetrical components; the study and measurements of machine constants by means of the oscillograph.

**624. Electronic Circuits for Instrumentation and Computation. (3-3). Credit 4. II**

Theory, analysis, and design of the electronic circuits used in instrumentation and computation. AC amplifiers, operational amplifiers, "and" circuits, "or" circuits, and "gate" circuits are included. Problems of drift compensation in DC amplifiers and closed-loop stability in multi-stage amplifiers are treated in detail. Prerequisites: Electrical Engineering 326, 457.

**626. Introduction to Electron Tube Design. (4-0). Credit 4. I**

The motion of ions in electric and magnetic fields, electron emission, and conduction through gases are studied. The applications of mass spectrometry, electron optics, and electron tube design are considered.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**628.* Design of Active Networks. (4-0). Credit 4. II**

A study of regeneration and feedback theory with emphasis on circuit design methods suitable for treatment of these topics. Prerequisites: Electrical Engineering 601; Mathematics 601 or the equivalent.

**636. Network Synthesis. (4-0). Credit 4. I**

Synthesis of electrical networks having arbitrarily specified terminal characteristics. Studies include realizability conditions, realization of general two-terminal and four-terminal networks and approximation of network specifications. Prerequisites: Electrical Engineering 601; Mathematics 601.

**637. Wave Guides and Cavities. (3-0). Credit 3. I**

Application of Maxwell's equations to the solution of guided electromagnetic fields. Course includes studies in skin effect, parallel plane wave guides, rectangular wave guides, circular wave guides, cavities, and microwave networks. Prerequisite: Electrical Engineering 451.

**638. Antennas and Propagation. (3-0). Credit 3. II**

Application of Maxwell's equations to determine the electromagnetic fields of antennas. Course includes studies in radiation, directional arrays, impedance characteristics, aperture antennas, propagation in free space, and propagation through the ionosphere. Prerequisite: Electrical Engineering 451.

**642. Transistors. (3-3). Credit 4. I, S**

Theory of junction triodes; voltage, current, power and frequency limitations. Small signal parameters and equivalent circuits for transistors; analysis of design of circuits at both small and large signal levels. Prerequisite: Electrical Engineering 326.

**644. Sampled Data Servomechanisms. (3-0). Credit 3. II**

A study of techniques for the analysis of sampled data and discrete data servo systems and associated synthesis procedures. Prerequisites: Electrical Engineering 605; Mathematics 617.

**646. Statistical Communication Theory. (3-0). Credit 3. II**

Generalized harmonic analysis of deterministic and random signals; elements of probability and statistics; detection of signals in noise; sampling theory; optimum linear systems. Prerequisites: Electrical Engineering 601; Mathematics 601.

**648. Electromagnetic Wave Propagation. (3-0). Credit 3. II**

A study of electromagnetic surface waves; direct and ground-reflected space waves; tropospheric refraction, reflection, and scattering; ionospheric refraction, reflection, and scattering; propagation via meteor trails and whistlers; space communication. Prerequisite: Electrical Engineering 451.

**653. Electronic Computer Design. (3-3). Credit 4. I, S**

Special function generation and system simulation for analog solution of both linear and non-linear differential equations, simulation techniques applied to control systems; advanced study of digital adders, subtractors, accumulators, multipliers, and dividers; digital error-detection; digital control; design of general purpose and special purpose digital computers. Prerequisite: Electrical Engineering 457.

**685. Problems. Credit 1 to 4 each semester. I, II**

Research problems of limited scope designed primarily to develop research technique.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

## Department of Engineering Graphics

Professor W. E. Street,
Professors S. M. Cleland, B. F. K. Mullins, J. P. Oliver, C. H. Ransdell, L. E. Stark; Associate Professor P. M. Mason; Assistant Professors N. B. Bardell, Jr., R. H. Davey, Jr., J. H. Earle; Instructors T. D. Bolinger, C. R. Cozzens, C. D. Lemons

**105. Engineering Graphics. (0-6). Credit 2. I, II, S**

Care and use of drawing instruments and equipment, vertical freehand lettering, engineering geometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

**106. Descriptive Geometry. (0-6). Credit 2. I, II, S**

Point, line, and plane relationships. Bearings and slopes of lines. Contours, cuts, and fills. Strike and dip. Successive auxiliary view problems. Revolution about an axis and true length diagrams. Developments, intersections, and vector graphics. Prerequisite: Engineering Graphics 105.

**127. Industrial Freehand Sketching. (1-3). Credit 2. II**

Basic techniques of freehand drawing in line and tone; delineation of form, textures, materials, sketching, and industrial applications of freehand drawing.

**128. Methods of Industrial Reproduction. (0-2). Credit 1. II**

Basic techniques of reproduction processes for industrial use.

**209. Nomography. (2-0). Credit 2. II, S**

Theory of type selection, design and construction of charts and graphs; methods and application of graphical mathematics for engineering and scientific problem solutions; theory and construction of nomographs including parallel scale charts, "N" or "Z" charts, proportional charts, and combined charts. Course is designed to enable students to properly present solutions of problems and technical reports encountered in junior, senior, and graduate courses. Prerequisites: Engineering Graphics 105, 106; Mathematics 121 or the equivalent.

**221. Building Construction Drawing. (1-3). Credit 2. II**

Architectural details in frame and masonry construction; general drawings and techniques of presentation. (For students in industrial education and building products marketing.) Prerequisite: Engineering Graphics 105 or the equivalent.

**403. Graphical Computation Devices. (1-3). Credit 2. II, S**

To teach the theory and methods of construction of graphical computation devices and to apply their use to the solutions of engineering and scientific problems. Prerequisites: Engineering Graphics 105, 106, 209 or the equivalent.

### FOR GRADUATES

**601. Advanced Industrial Drawing. (2-3). Credit 3. I, S**

Problems pertinent to all industrial fields. Solutions involve projections, primary auxiliary views, successive auxiliary views, revolutions, flat pattern layouts, perspective, and shades and shadows. Use of drafting machines and other special drafting equipment. Appropriate for high school and college teachers. Prerequisites: Engineering Graphics 106, 127 or equivalent.

**603. Advanced Machine Drawing. (1-6). Credit 3. II, S**

Conventional practices, dimensioning, fastenings, machine and pictorial sketching. Empirical design including problems of stuffing boxes, piping, shafting, gears, cams, ship and aircraft parts. Use of special drafting equipment such as drafting machine, section liner, proportional dividers, erasing machines, light table, and mechanical lettering guides. Methods of reproduction. Appropriate for high school and college teachers. Prerequisite: Engineering Graphics 106 or equivalent.

**605. Spherical Projections.* (2-0). Credit 2. I, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Graphics 106 or the equivalent.

**606. Stereographic and Clinographic Projections.* (2-0). Credit 2. II, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related feilds. Prerequisite: Engineering Graphics 106 or the equivalent.

**607. Descriptive Geometry for Teachers.* (4-0). Credit 4. II, S**

Fundamental concepts of descriptive geometry. The design and organization of problems and teaching devices for college teachers. Prerequisites: Engineering Graphics 106; Industrial Education 323; or the equivalent.

**611. Technical Illustration.* (3-3). Credit 4. I, S**

Axonometric projection including shading. Design and construction of display layouts. Commercial and technical illustrating. Prerequisites: Engineering Graphics 106, 601 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable an individual or small group to undertake and complete with credit numerous problems in graphical communication. It may be limited investigations, laboratory work, or conferences and discussion. Prerequisites: Engineering Graphics 105, 106; Industrial Education 323 or the equivalent; graduate classification; and approval of the instructor.

## Department of English

Professor J. Q. Anderson,
Professors J. P. Abbott, R. H. Ballinger, F. E. Ekfelt, J. Q. Hays, C. D. Laverty, S. S. Morgan; Associate Professors R. W. Barzak, A. L. Bennett, K. E. Elmquist, C. A. Greer, L. F. Hauer, H. E. Heirth, P. C. Hunter, Jr., H. L. Kidd, Jr., L. J. Martin, E. E. Stokes, Jr.; Assistant Professors R. E. Cain, S. S. Cox, H. S. Creswell, E. P. Crittenden, C. K. Esten, M. A. Huggett, J. S. Jernigan, W. B. Kadow, L. B. Keel, H. P. Kroiter, H. J. Luke, Jr., T. J. Mattern, J. F. Peirce, F. W. Powell, Allen Schrader, J. N. Shepperd, Victor Wiening; Instructors S. L. Archer, J. P. Guinn, Jr., K. L. James, E. E. McMahan, G. I. Morton, F. A. Rodewald, C. E. Schatte, M. G. Scott

**100. English for Foreign Students. (3-0). Credit 3. II, S**

Fundamentals of speaking and writing in English for students whose native language is not English. Students entering the course are expected to have studied English and to be able to communicate in English. **No credit will be granted for the satisfactory completion of this course.** (See the entry for course 100 under the Department of Modern Languages.)

**103. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. Readings in modern prose (non-fiction). Emphasis on language study and the mechanics of writing. (Special sections are offered for students of high proficiency and low proficiency in writing.)

**104. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

**203. Introduction to Literature. (2-0). Credit 2. I, II, S**

Reading in three of the following types: plays, stories, novels, and poems, chiefly modern. Papers on the readings. Prerequisites: English 103, 104.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of Graduate Studies.

**207. Report Writing and Correspondence. (2-0). Credit 2. I, II**
The writing of technical reports and business letters. Prerequisites: English 103, 104.

**210. Introduction to Logical Discourse. (2-0). Credit 2. I, II, S**
The principles of reasoning and their application in reading and writing. Prerequisites: English 103, 104.

**212. Shakespeare. (3-0). Credit 3. I, II, S**
A study of the major plays of Shakespeare, with lectures on his life, his language, and his cultural environment. Prerequisites: English 103, 104.

**231. Survey of English Literature. (3-0). Credit 3. I, II, S**
A survey of the literature of England from Anglo-Saxon times to Dr. Samuel Johnson. Prerequisites: English 103, 104.

**232. Survey of English Literature. (3-0). Credit 3. II, S**
A survey of the literature of England from mid-eighteenth century to the twentieth century. Prerequisites: English 103, 104.

**301. Writing for Professional Men. (3-0). Credit 3. I, II, S**
Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program of English.

**309. The English Language. (3-0). Credit 3. I** †
Survey of the grammatical structure, vocabulary, and history of the English language, with brief discussion of related languages. Prerequisites: Two courses in sophomore English. (Offered in 1963-64 and in alternate years thereafter.)

**310. Phonetics and Pronunciation. (3-0). Credit 3. II** †
Introductory discussion of the nature of language and of language study. Detailed study of the formation of English sounds, of usage in pronunciation, and of phonetic and phonemic principles. Prerequisites: Two courses in sophomore English. (Offered in 1964-65 and in alternate years thereafter.)

**315. Seventeenth Century Literature. (2-0). Credit 2. I, S**
A period course in English poetry and prose of the seventeenth century, not including Shakespeare. Prerequisites: Two courses in sophomore English.

**316. Eighteenth Century Literature. (2-0). Credit 2. I, S**
A period course in English poetry and prose of the eighteenth century. Prerequisites: Two courses in sophomore English.

**319. Report Writing. (1-0). Credit 1. I**
The preparation of technical reports in the form observed by the Petroleum Division of the A.I.M.E., the American Petroleum Institute, and the American Association of Geologists. Prerequisite: English 104.

**320. Selected Reading. (1-0). Credit 1. I, II**
The reading of five books. Objects: to teach students to read good books and to enjoy and understand good literature.

**321. Nineteenth Century Literature (Romantic). (3-0). Credit 3. I** †
A study of the intellectual tendencies of the nineteenth century as reflected in the poetry of Wordsworth, Coleridge, Byron, Shelley, Keats, and others. Prerequisites: Two courses in sophomore English.

**322. Nineteenth Century Literature (Victorian). (3-0). Credit 3. II** †
A continuation of the study in nineteenth century thought as reflected in the writings of Tennyson, Browning, Arnold, and other Victorians. Prerequisites: Two courses in sophomore English.

**325. Creative Writing. (2-0). Credit 2. I**

The writing of stories, one-act plays, essays, editorials, and feature articles. Limited to students who have made an average of C in the prerequisite courses. Prerequisites: Two courses in sophomore English.

**327. American Literature to 1870. (2-0). Credit 2. I** †

A study of American literature from the Colonial Period through the Civil War. Prerequisites: Two courses in sophomore English.

**328. American Literature from 1870 to 1920. (2-0). Credit 2. II** †

A study of American writing from Whitman and Mark Twain to Frost and Dreiser. Prerequisites: Two courses in sophomore English.

**329. Folklore and Folk Songs. (3-0). Credit 3. II**

Folklore and folk songs beginning with Old English ballads and continuing through Indian, Negro, French, and Spanish types in the United States. Prerequisite: Freshman English.

**334. Science in Literature. (3-0). Credit 3. II**

The main developments in the history of science as they are presented in the literature of the Western World. Prerequisites: Two courses in sophomore English. (Offered in 1964-65 and in alternate years thereafter.)

**336. Life and Literature of the Southwest. (3-0). Credit 3. II**

A study of the culture of the Southwest as expressed in literature. Prerequisite: A course in sophomore English. (Offered in 1963-64 and in alternate years thereafter.)

**340. Modern Drama. (3-0). Credit 3. II, S** †

A study of representative plays (in translation) by such dramatists as Ibsen, Hauptmann, Rostand, and Pirandello on the Continent, and Pinero, Shaw, Synge, O'Neill, and Maxwell Anderson in England and America. Prerequisites: Two courses in sophomore English.

**350. Modern Literature. (3-0). Credit 3. I** †

British and American novelists, poets, and dramatists from about 1920 to the present, with lectures on the social and intellectual background. Prerequisites: Two courses in sophomore English. (Offered in 1964-65 and in alternate years thereafter.)

**371. Great Books. (3-0). Credit 3. I, II, S**

Greek plays, Roman lives (from Plutarch), Dante's **Inferno**, Shakespeare's **King Lear,** a Russian novel, twenty English poems, a modern novel. Prerequisite: Completion of the sophomore program in English.

**372. Great Books. (3-0). Credit 3. II, S**

Offered in alternate semesters with English 371. Typical works: Homer's **Iliad**, Lucretius' **On the Nature of Things**, Chaucer's **The Canterbury Tales** (selected), Rabelais' **Gargantus and Pantagruel**, Marlowe's **Dr. Faustus**, Cervantes' **Don Quixote**, Goethe's **Faust** (Part 1), Dostoyevsky's **Crime and Punishment**, and James' **The Turn of the Screw**. Prerequisite: Completion of the sophomore program in English.

**375. Great American Writers. (2-0). Credit 2. II**

The most important works of five or six distinguished American writers of the nineteenth and twentieth centuries chosen from Emerson, Melville, Whitman, Twain, James, Glasgow, and Frost. Prerequisite: One course in sophomore English.

**381. Play Production. (2-3). Credit 3. I**

Production of plays from the point of view of the director, the actor, and the technician. Students will participate in at least two plays with some work in television. Prerequisite: Completion of the sophomore program in English.

**382. Stagecraft. (2-0). Credit 2. II**

Methods of staging plays—scene design and construction as well as stage lighting. Participation in plays scheduled. Prerequisite: Completion of the sophomore program in English.

**401. Public Speaking. (0-2). Credit 1. I, II, S**

Practice in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the sophomore program in English.

**403. Speaking for Professional Men. (1-2). Credit 2. I, II, S**

Speech training for technical students in their professional fields. Speeches of social and technical interest; group discussions; parliamentary procedure. Prerequisite: Completion of sophomore program in English.

**407. Speaking and Oral Interpretation. (1-2). Credit 2. II**

Speech training with special attention to the student's professional field and instruction and practice in the oral interpretation of literature, both prose and poetry. (Students may not receive credit for both English 403 and 407.) Prerequisite: Completion of sophomore program in English.

**412. Shakespeare. (3-0). Credit 3. II** †

Close attention to the plays themselves. The student will also devote time to the texts, to Elizabethan language, to Elizabethan dramatic theory and history and Shakespeare's relation to them, and to Shakespeare criticism and scholarship. Prerequisite: English 212 or six hours of 300 or 400 level courses in literature.

**428. The Novel in English. (3-0). Credit 3. I** †

A study of the novel in English in the eighteenth, nineteenth, and early twentieth centuries. Prerequisites: Two courses in sophomore English. (Offered in 1964-65 and in alternate years thereafter.)

**431. Chaucer. (3-0). Credit 3. I** †

Readings from the works of Chaucer, with consideration of the institutions and society of the pre-Renaissance period and Chaucer's language. Prerequisite: English 231 or six hours of 300 or 400 level courses in English.

**461. Teaching of Language and Composition. (3-0). Credit 3. S** †

A study of administrative and teaching problems involved in high school and college courses in composition. The organization and presentation of courses designed to improve student writing; various points of view toward language study held by teachers and students of linguistics; papers written by students and graded and criticized by instructor; supervised practice in grading and criticizing of student writing; the organizing of the curriculum in English from the grades to college. The course is intended for students expecting to teach English, for teachers of other subjects, and for principals and superintendents confronted with problems of organizing and administering the English program. Prerequisite: Senior classification or approval of instructor.

**485. Problems. Credit 1 to 3. I, II, S** †

Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his over-all knowledge of literature and the criticism of literature. There will be written reports on the readings and a semester examination. Prerequisite: Eighteen hours of English.

## FOR GRADUATES

**613. Studies in the Renaissance. (3-0). Credit 3. I**

Reading in the poetry, prose, and drama exclusive of Shakespeare. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**615. Seventeenth Century English Literature. (3-0). Credit 3. I, II, S**
Studies in the poetry and prose of the chief writers of the seventeenth century—Bacon, Donne, Jonson, Herrick, Milton, and Dryden. Research papers. Prerequisites: Graduate classification; approval of the Head of the Department.

**616. Studies in the Eighteenth Century. (3-0). Credit 3. II**
Poetry and prose from Dryden to Blake. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**632. Studies in the Nineteenth Century. (3-0). Credit 3. I**
Romantic and Victorian writers, along with the literary, religious, and scientific issues of the century. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**675. Studies in American Literature. (3-0). Credit 3. II**
Reading in American writers, with emphasis on a particular literary development or on a literary type. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**
Special readings designed to supplement the student's knowledge of English and American literature in subjects which he has not studied in other courses. Research papers. Prerequisites: Graduate classification; approval of the Head of the Department.

**691. Research. Credit 1 to 4. I, II, S**
Research for thesis. Prerequisite: Graduate classification.

## Department of Entomology

Professor J. C. Gaines,
Professors V. A. Little, J. R. Brazzel; Associate Professors P. L. Adkisson,
R. L. Hanna, D. R. King, M. A. Price, N. M. Randolph, J. N. Weaver;
Assistant Professors H. R. Burke, P. J. Hamman

**201. General Entomology. (2-2). Credit 3. I, II, S**
A study of the principal orders of insects; the relation of anatomy and physiology of insects to control methods; the principal insecticides and their uses; the development, habits, and economic importance of the more common insects with control methods for the injurious species.

**208. Veterinary Entomology. (2-3). Credit 3. I, II**
A study of insects and other arthropods that are parasitic upon domestic animals concerned primarily in the transmission of diseases. Methods of eradication and control are emphasized. Prerequisite: Sophomore classification in pre-veterinary medicine and animal husbandry.

**301. Systematic Entomology. (2-3). Credit 3. I** †
A systematic study of the orders and families of insects, and the distinguishing characteristics of representative species. The preparation of insect collections and the use of keys for identification are emphasized in practice. Prerequisite: Entomology 201 or equivalent.

**302. Systematic Entomology. (2-3). Credit 3. II** †
A continuation of Entomology 301, including orders and families of insects not studied in Entomology 301. Prerequisite: Entomology 301.

**305. Insect Morphology. (2-3). Credit 3. I** †
General morphology of typical insects with special emphasis on those structures of particular importance in systematic and applied entomology. Prerequisite: Entomology 201 or equivalent.

**306. Insect Physiology. (2-3). Credit 3. II** †

Internal anatomy and principles of physiology as applied to insects. Prerequisite: Entomology 305.

**313. Biology of Insects. (2-3). Credit 3. I**

General biology and taxonomy of the classes of Arthropoda. Emphasis is placed on the orders and more important families of Hexapoda, their marks of identification, general biology, and their relations to other animals. The use of keys for the identification of insects and other arthropods is stressed in the laboratory. Prerequisite: Three hours of biological sciences.

**401. Principles of Insect Control. (2-3). Credit 3. I** †

A study of both applied and natural controls emphasizing the uses, practical application, and the physical and chemical properties of the more important insecticides. Prerequisite: Entomology 201.

**402. General Economic Entomology. (2-3). Credit 3. II** †

The nature of injury, life history, habits and control of the common insects attacking stored products, cereal, forage, cotton, ornamentals, fruits, vegetables, man, household, and livestock are studied. Practical methods of insect control are demonstrated in laboratory. Prerequisite: Entomology 201.

**405. Horticultural Pests. (2-2). Credit 3. II**

This course deals with insect problems of fruit, nuts, truck crops, and ornamentals. The biologies, type of damage, and recognition of these pests are considered. Also the approved insecticidal, biological, and natural controls as well as preventive measures are studied. Prerequisite: Entomology 201 or the equivalent.

**423. Comparative Anatomy of Arthropods. (2-3). Credit 3. I**

A detailed comparison of the digestion, respiration, circulation, excretion, and nervous system of arthropods and related animals. Taxonomic characters are also stressed. Prerequisite: Entomology 305 or equivalent.

**424. Insect Ecology. (2-3). Credit 3. II**

The effect of environmental factors upon the distribution, abundance, competition, and ecological succession of insects. Prerequisite: Entomology 302 or equivalent.

**481. Seminar. (1-0). Credit 1. I, II**

Report of original investigations, current literature, and special features. Required for entomology seniors and graduate students each semester.

**485. Problems. Credit 1 to 4. I, II, S**

Individual problems for beginners in research. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**601, 602. Systematic Entomology. (3-3). Credit 4 each semester. I, II**

A taxonomic study of the orders and families, including genera and species of the class Hexapoda; also a study of the International Rules of Nomenclature. A special study of some particular group of insects is required in practice. Prerequisite: Entomology 302.

**607. Economic Entomology. (3-3). Credit 4. I, S**

This course is designed chiefly for workers in vocational agriculture and the Extension Service. It includes studies of agricultural pests, their biologies, economic importance as determined by making infestation records, and the use of control measures. Also, insecticides and methods of application are considered. Prerequisite: Approval of Head of Department.

**608. Economic Entomology. (3-3). Credit 4. II**

A detailed study of insect pests, including identification, distribution, principles and methods of natural, cultural, and chemical controls. Literature and research methods are also stressed. Prerequisite: Entomology 401 or 402.

**613, 614. Morphology. (3-3). Credit 4 each semester. I, II**

A detailed study of anatomical structures of insects. Prerequisite: Entomology 305.

**615. Insect Physiology. (3-3). Credit 4. I**

A study of the physiology of respiration, circulation, digestion, and excretion; the mechanical and chemical senses of insects are considered. Prerequisite: Entomology 306 or equivalent.

**617, 618. Medical Entomology. (3-3). Credit 4 each semester. I, II**

The taxonomy and biology of parasitic insects, ticks, mites and their role in the causation and transmission of diseases affecting man and domestic animals. Prerequisite: Entomology 208 or equivalent.

**619. Insect Toxicology. (3-3). Credit 4. II**

Chemical compounds which possess toxic properties; actions of poisons on insects; evaluation of insecticides in the laboratory and field; and mathematical analysis of data. Prerequisite: Entomology 615.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Entomological problems not pertaining to a thesis or dissertation are considered. Prerequisites: Graduate classification with major or minor in entomology; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research problems on taxonomy, life histories, biological control, ecology, and physiology of insects, and the toxicology of insecticides. Prerequisite: Graduate classification.

## Department of Geography

Professor G. W. Schlesselman,
Professor F. E. Smith; Associate Professor E. B. Doran, Jr.

**201. World Regional Geography. (3-0). Credit 3. I, II, S**

A study of the differences in physical and cultural environment over the earth's surface, with emphasis on the changes in the landscape created by man. Culture "worlds" are recognized as a means of presenting these differences in orderly fashion.

**203. Physical Geography. (3-3). Credit 4. I, II**

This course consists of a systematic description and interpretation of the distribution patterns and the regional associations of natural phenomena on the face of the earth.

**204. Economic Geography. (3-0). Credit 3. I, II**

A study of the commercial regions of the world, dealing with the production types or occupations, such as grazing, plantation farming, grain farming, fishing, lumbering, mining, and manufacturing.

**302. Geography of Europe. (3-0). Credit 3. II**

A geographical survey of Europe as a whole and of the individual countries.

**303. Geography of South America. (3-0). Credit 3. I**

Investigations of trade opportunities in South America. The economic activities of the major geographic regions as reflecting the present day utilization of the natural resources. Possibilities of future development.

**304. Geography of Asia. (3-0.) Credit 3. II**

A general study of the continent of Asia and a more detailed study of selected regions.

**312. Conservation of Natural Resources. (3-0). Credit 3. II**

A study of natural resources including ways and means of insuring wise utilization of essential or strategic resources.

**320. Geography of the Pacific Basin. (3-0). Credit 3. I**

Geographic aspects of the Pacific Ocean area. Physical characteristics, native people, discovery and exploration, political and economic factors; regional studies of sub-areas.

**401. International Political Geography. (3-0). Credit 3. I** †

A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments.

**485. Problems. Credit 1 to 4. I, II**

Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of the Head of the Department.

### FOR GRADUATES

**601. Economic Geography. (4-0). Credit 4. I**

A regional survey of the world distribution of major agricultural and industrial commodities with particular attention to the causal action of national, social, and economic factors. (Offered in 1963-64 and in alternate years thereafter.)

## Department of Geology and Geophysics

Professor S. A. Lynch,
Professors H. R. Blank, Peter Dehlinger*, T. J. Parker, W. L. Russell, F. E. Smith; Associate Professors K. J. Koenig, M. C. Schroeder, C. L. Seward, Jr.;
Instructor B. H. Atwell

### GEOLOGY

**201. General Geology. (3-0). Credit 3. I, II**

The agents and processes that have produced the surface features of the earth and the structure of the earth's crust. Prerequisites: Chemistry 101 or 103 or equivalent; registration in Geology 203 or 207; registration in Geology 209 for majors in geology, geophysics, and geological engineering.

**203. Crystallography and Mineralogy. (2-6). Credit 4. I**

Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chemistry 102 or 104; Engineering Graphics 106; Mathematics 102, 103.

**204. Mineralogy and Rock Study. (1-3). Credit 2. II, S**

Continuation of Geology 203. Recognition and classification of common rocks by their megascopic characteristics. Prerequisites: Chemistry 207 or registration therein; Geology 203.

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*Resigned 10-31-62.

**205. Elemental Geology. (3-3). Credit 4. I, II**

General principles of physical geology, physiography, geologic processes, and an introduction to historical geology. Laboratory work on common minerals, rocks, and maps. Primarily for arts and science students.

**206. Elementary Historical Geology. (3-3). Credit 4. I, II**

An introduction to historical geology, including a review of the hypotheses of the earth's origin, the significance of fossils, the origin and character of selected geologic formations, and the development of the North American continent. Prerequisite: Geology 201, or 205, or 320.

**207. Mineralogy and Rock Study. (2-6). Credit 4. I**

Practical hand specimen determination of common minerals and rocks by means of their physical properties. Study of well cuttings and cores. This course should be taken simultaneously with Geology 201. A course designed for petroleum engineers. Prerequisites: Chemistry 102 or 104; Mathematics 103 or the equivalent.

**209. Introduction to Field Work. (0-3). Credit 1. I**

One-half day each week studying geologic processes. Scientific methods of field work are stressed. Should be taken concurrently with Geology 201 and cannot be taken for credit after credit is received for Geology 210.

**210. Historical Geology. (3-3). Credit 4. II, S**

Principles of stratigraphy and paleontology, the physical and organic record of the earth's history, hypotheses of the earth's origin. Prerequisites: Chemistry 102 or 104; Engineering Graphics 106; Geology 201 and 203, or 201 and 207, or 205 and approval of Head of Department; Mathematics 102, 103.

**299. Field Geology. Credit 2. Intersession**

Geological observations and mapping in an area exhibiting diversity of rock types, structures, and physiography. Prerequisites: Geology 201; approval of Head of Department.

**300. Field Geology. Credit 6. S**

Geologic mapping in selected areas in the Llano Uplift and the Marathon Basin. Written report. Prerequisites: Civil Engineering 208; Geology 204, 305, 306, 312.

**303. Petrography and Petrology. (2-3). Credit 3. I** †

Principles of optical mineralogy; identification of minerals in fragments and thin sections by use of the petrographic microscope; thin section study of igneous rocks, and their classification. Prerequisites: Chemistry 207; Geology 204.

**304. Sedimentary Petrography. (2-3). Credit 3. II** †

Microscopic study of sedimentary and metamorphic rocks in thin sections; heavy mineral analysis; description, origin, and classification of sedimentary and metamorphic rocks. Prerequisite: Geology 303.

**305. Invertebrate Paleontology. (3-3). Credit 4. I**

The morphology, classification, and geologic range of the principal invertebrate groups. Prerequisite: Geology 210.

**306. Stratigraphy. (3-3). Credit 4. II**

Stratigraphic studies of the United States with emphasis on the Gulf Coastal Plain formations and their correlation by means of invertebrate fossils. Laboratory studies consist of stratigraphic principles and the changing faunas through geologic time. Prerequisite: Geology 305.

**309. Agricultural Geology. (3-3). Credit 4. II**

Erosion, transportation, and deposition by water, wind, and ice. Chemical and physical processes of development and destruction of soils. Origin, development, and interpretation of surface features of the earth. Elements of earth structure and geologic history. Earthquakes, volcanoes, and mountains. Laboratory work in determination of rock-making minerals and common rocks and interpretation of topographic and geologic maps.

**312. Structural Geology. (2-3). Credit 3. II**

The interpretation of rock structures; their relation to stratigraphic, physiographic, and economic problems. Prerequisites: Geology 201, 204 or 207, 210.

**315. Principles of Sedimentation. (2-3). Credit 3. I**

Factors of environment, production, transportation, and deposition of sediments; products resulting from the operation of sedimentary processes; structures, textures, and colors of sediments. Laboratory work in collecting and sampling, mechanical analysis, methods of analyzing and presenting data. Prerequisites: Chemistry 207; Geology 201, 203, 204, 210.

**317. Stratigraphic Paleontology. (0-3). Credit 1. II**

Laboratory studies of the changes in faunas throughout geologic time. Prerequisite: Geology 305.

**320. Geology for Civil Engineers. (2-3). Credit 3. I, II**

Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundations, and excavation. Prerequisite: Sophomore classification in civil engineering.

**399. Field Geology of the Gulf Coast Tertiary. Credit 6. S**

Mapping, stratigraphy, and structure in the Tertiary of the Gulf Coast area. Given as a summer field camp. May be used to substitute for Geology 433 and 4 hours of technical elective. Prerequisite: Geology 300.

**404. Geology of Petroleum. (2-3). Credit 3. I**

Origin, migration, and accumulation of petroleum. Typical United States oil and gas fields. Laboratory work in subsurface geology. Prerequisites: Geology 300, 306, 312.

**406. Economic Geology. (3-0). Credit 3. I** †

The application of principles of geology, chemistry, and physics to the formation of useful minerals and rocks and a general survey of such deposits. Prerequisites: Chemistry 323; Geology 300, 306, 312.

**409. Geology of Non-Metallics Other than Petroleum. (3-0). Credit 3. II** †

The mineralogy, stratigraphic, and structural relations, origin, geographic distribution, uses, and economics of non-metallic mineral deposits other than petroleum. Prerequisites: Chemistry 323; Geology 300, 306, 312.

**422. Natural Structural Materials. (2-3). Credit 3. II**

Building stones and stone products, with special emphasis on clays and clay products, their qualities, occurrences, uses, and processes of fabrication and manufacture. For students registered in architecture or engineering. Prerequisite: Junior classification.

**423. Micropaleontology. (1-6). Credit 3. II** †

A systematic survey of the important groups of micro-fauna with particular emphasis on their classification and use. Prerequisite: Geology 305.

**425. Subsurface Geology. (2-3). Credit 3. II** †

Study of well cuttings and cores; electrical, radioactive, drilling time, and caliper logs. Preparation of subsurface contour maps and cross sections. Prerequisites: Geology 300, 404; approval of Head of Department.

**427. Stratigraphy. (3-0). Credit 3. II**

Stratigraphy of North America with emphasis on the principles of stratigraphy. Prerequisite: Geology 210.

**431. Geomorphology. (2-3). Credit 3. I**

Principles and fundamentals of geomorphology. Laboratory work in advanced map interpretation. Prerequisites: Geology 300, 306, 312.

**433. Field Geology. (0-6). Credit 2. II** †

Two full afternoons per week devoted to the acquirement of techniques of field geology in areas adjacent to the campus. Prerequisites: Geology 300, 306.

**437. Cenozoic Micropaleontology. (1-6). Credit 3. I** †

Cenozoic micro-fauna of the Gulf Coast Province with emphasis on subsurface correlation. Prerequisite: Geology 423.

**441. Advanced Engineering Geology. (3-3). Credit 4. I** †

A survey of those phases of mineralogy, petrology, historical geology, structural geology, and the sedimentation that may be applied to engineering problems. Not available to geology or petroleum engineering majors. Prerequisites: Senior classification; approval of Head of Department.

**481. Seminar. (1-0). Credit 1. I**

Review of current literature and technical developments. Discussion of certain legal aspects of the petroleum industry. Each student will make both oral and written reports. Prerequisites: Geology 300, 306, 312.

**482. Seminar. (1-0). Credit 1. II**

Continuation of Geology 481. Each student will prepare more advanced reports. Prerequisites: Geology 300, 306, 312.

**485. Problems. Credit 1 to 3. I, II, S**

Advanced problems in geology.

**599. Rocks and Minerals. (2-3). Credit 3. S**

Study of rocks and minerals and megascopic determination by means of their physical properties. Study of the agents and processes forming minerals, rocks, and mineral deposits. For secondary school teachers. Prerequisites: Geology 600; graduate classification; approval of Head of the Department.

## FOR GRADUATES

**600. Earth Science for Secondary School Teachers. (2-3). Credit 3. S**

Survey of the fundamental principles of physical geology, geologic processes, and earth history including the origin and nature of the solar system. Designed to aid secondary school instructors in presenting earth sciences. Prerequisites: Graduate classification; approval of Head of Department.

**601. Advanced Research Techniques. (1-0). Credit 1. I**

An introduction to modern instrumentation techniques and methods used in geology. Prerequisite: Graduate classification.

**609. Field Geology. Credit 2 to 6. I, II, S**

Systematic geologic surveying of selected areas. Prerequisite: Geology 300.

**612. Structural Geology. (3-0). Credit 3. I**

A detailed study of geologic structures and a consideration of theories regarding earth movements, with selected readings. Prerequisite: Geology 312.

**616. Micropaleontology. (1-6). Credit 3. I**

Study of microscopic fossils and their uses in correlation. Laboratory work in the examination of well samples. Prerequisite: Geology 423.

**618. Sedimentation. (3-0). Credit 3. II**

Investigation of processes of sedimentation with analytical laboratory work on sedimentary rocks. Seminar. Prerequisite: Geology 315.

**619. Petroleum Geology. (3-0). Credit 3. II**

A theoretical study of some of the problems in petroleum geology. Prerequisite: Geology 404.

**620. Geology of Ground Water. (3-0). Credit 3. I**

Principles of occurrence and movement of water beneath the earth's surface, and the influence of various geologic situations upon its behavior. Factors applying to estimates of supply. Engineering aspects of ground water.

**622. Stratigraphy. (3-0). Credit 3. I**

Sources and depositional environment of sediments, character and relation of sedimentary strata, and the principles involved in delimiting, correlating and naming stratigraphic units.

**625. Advanced Ground Water Geology. (3-0). Credit 3. II**

Seminar course in the application of the principles of advanced geology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent; approval of Head of Department.

**627. Continental Evolution Outside of North America. (2-0). Credit 2. II**

A reading and conference course on the available literature dealing with the basic geology of areas outside of North America.

**629. Structural Framework of North America. (3-0). Credit 3. II**

Description of the important geologic structures of North America and of the development of regional structural features in geological times. Prerequisite: Graduate classification.

**631. Geology in Engineering Construction. (3-0). Credit 3. II**

Geologic principles applied to the construction of highways, foundations, bridge abutments and piers, tunnels, dams, reservoirs, etc. Construction materials. Test borings and their interpretation. Prerequisites: Graduate classification; approval of instructor.

**639. Paleozoic and Mesozoic Paleontology. (3-0). Credit 3. I**

Study of the important faunas of these eras. Prerequisites: Graduate classification; approval of Head of Department.

**640. Cenozoic Paleontology. (3-0). Credit 3. II**

Study of the important faunas of this era with emphasis on the megafossils of the Gulf Coast. Prerequisites: Graduate classification; approval of Head of Department.

**643. Paleozoic Stratigraphy. (3-0). Credit 3. II**

Stratigraphy of the Paleozoic System with particular emphasis on the Paleozoic of West Texas and Oklahoma. Prerequisites: Graduate classification; approval of Head of Department.

**644. Mesozoic Stratigraphy. (3-0). Credit 3. II**

Study of the stratigraphy of the Mesozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**645. Cenozoic Stratigraphy. (3-0). Credit 3. II**

Study of the Cenozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**646. Gulf Coast Stratigraphy. (3-0). Credit 3. II**

Detailed study of the Mesozoic and Cenozoic Systems of the Gulf Embayment. Prerequisites: Graduate classification; approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geology to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geological problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geology. Research for thesis or dissertation.

## GEOPHYSICS

**435. Principles of Geophysical Exploration. (3-3). Credit 4. I** †

Principles of the different methods used in geophysical exploration with emphasis on the interpretation of geophysical data and physical properties of rocks. Prerequisites: Geology 312; Mathematics 122 or 210; Physics 219; approval of Head of Department for majors in other departments.

**436. Seismic Exploration. (2-3). Credit 3. II** †

Study of seismic investigations with artificial sources, including field procedures, instrumentation, and interpretation of data. Prerequisite: Geophysics 435.

**446. Physics of the Earth. (3-0). Credit 3. II** †

A study of the earth's elastic and inelastic behavior, its gravitational, magnetic, electrical and thermal fields, the effect of forces acting within the earth, and implications of these factors during geologic time. Prerequisites: Geology 312; Mathematics 122 or 210; Physics 219; approval of Head of Department for majors in other departments.

**485. Problems. Credit 1 to 3. I, II, S** †

Advanced problems in geophysics.

## FOR GRADUATES

**651. Theoretical Seismology. (3-0). Credit 3. I**

Mathematical development of elasticity theory and stress waves in bounded and unbounded solid media. Prerequisites: Geophysics 435 or registration therein; Mathematics 308; approval of Head of Department for majors in other departments.

**653. Gravity and Magnetic Methods. (3-0). Credit 3. II**

Study of the earth's gravity and magnetic fields; the role of gravity in geodesy; methods, instruments, and interpretation of data in gravity and magnetic methods of exploration. Prerequisites: Geophysics 435; Mathematics 308.

**655. Electrical and Radioactivity Methods. (2-0). Credit 2. II**

Study of procedures, instruments, and interpretation of data obtained from electrical, electromagnetic, and radioactivity methods of exploration. Minor emphasis is on geothermal and geochemical methods. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**657. Earthquake Seismology. (2-0). Credit 2. I**

Study of earthquakes, their causes, effects, method of location, determination of wave paths, interpretation of deep structures; and instruments used for recording. Prerequisites: Geophysics 435, 651 or registration therein.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geophysics to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geophysical problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geophysics. Research for thesis or dissertation.

## Department of Health and Physical Education

Professor C. E. Tishler,
Professors A. D. Adamson, W. M. Dowell, C. W. Landiss, W. L. Penberthy, H. B. Segrest*; Associate Professors P. M. Andrews, Emil Mamaliga, L. L. Palmer, N. A. Ponthieux; Assistant Professors C. E. McCandless, H. H. Walton, R. K. Wieder

### HEALTH EDUCATION

**216. First Aid. (0-3). Credit 1. I, II, S**

Prepares students for Red Cross Standard, Advanced, and Instructor's First Aid Certificates.

**218. Athletic Injuries. (1-3). Credit 2. II**

A study of the conditioning and training of the individual and team; care and prevention of injuries. Prerequisites: Biology 219; Health Education 216.

**415. Secondary School Health Education. (3-0). Credit 3. I, S** †

A study of health problems; needs of the individual; cooperation of home and community; resources for health in community, state, and nation; techniques of evaluation. Prerequisites: Biology 225; approval of instructor.

**421. Elementary School Health Education. (3-0). Credit 3. II** †

A study of modern trends and methods in the elementary school health program; survey of materials and agencies and their value to an adequate health program. Prerequisites: Biology 225; approval of instructor.

### FOR GRADUATES

**631. Community and Public Health. (3-0). Credit 3. S**

A study of community health problems and of public health measures to solve them. Typical organizations and specific functions of state and local health departments; relationship of local health department to state and federal health agencies and programs. Prerequisite: Health Education 415 or 421. (Offered in 1963-64 and in alternate years thereafter.)

### PHYSICAL EDUCATION

Physical Education 101, 102, 201, and 202 are required in all curricula. Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be urged to register for general conditioning activities. All others may elect to register for one of the following activities: adapted activities, badminton, basketball, bowling, boxing, conditioning, diving, fencing, golf, gymnastics, handball, life saving, soccer, speedball, swimming, tennis, trampolining, volleyball, water polo, weight training, or wrestling. The purpose of these courses is to teach the student through instruction and practice the fundamental knowledge and skills of at least two activities in which he will be able to participate in adult life. No student will be permitted to repeat an activity unless he has failed it.

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*Resigned 10-15-62.

Students may elect Physical Education 301, 302 for credit of one hour each after having completed the required courses.

**101. Required Physical Education. (0-2). No Credit. I, II**

**102. Required Physical Education. (0-2). No Credit. I, II**

**201. Required Physical Education. (0-2). No Credit. I, II**

**202. Required Physical Education. (0-2). No Credit. I, II**

**210. Life Saving and Pool Management. (1-3). Credit 2. II**

Designed to qualify students for Red Cross Senior Life Saving and Instructor's certificates; includes a study of sanitary codes and pool sanitation, problems of pool and waterfront management; selection of personnel. Prerequisite: Advanced swimming. (Offered in 1964-65 and in alternate years thereafter.)

**211. Physical Education Activities. (1-3). Credit 2. I**

A basic course designed to provide instruction and development of skill in physical education activities with emphasis on team type activities other than in the major sports.

**212. Physical Education Activities. (1-3). Credit 2. II**

This course is designed to provide instruction and development of skill in physical education activities with emphasis on individual and dual type sports.

**213. Introduction to Health and Physical Education. (3-0). Credit 3. I, II**

The approach, fundamental principles and application of principles; definition, traditions, developments, psychology, aims, objectives, and results of physical education; building a program of health and physical education.

**221. Safety Education. (2-0). Credit 2. I**

A study of the general program of safety education; accidents, preventive measures, traffic safety, safety at home, school, and work; visual aids, safety projects, special programs; utilization of agencies outside of school.

**251. Coaching of Basketball. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in basketball.

**253. Coaching of Baseball. (1-3). Credit 2. II**

Teaching of individual techniques; position play; training; team offensive and defensive strategy. Prerequisites: Junior classification; approval of instructor. (Offered in 1963-64 and in alternate years thereafter.)

**255. Coaching of Track. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in track and field events.

**301. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**302. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**315. Elementary School Physical Education. (3-0). Credit 3. II**

Organization of physical activities in public schools; methods in teaching games used in public school programs. Prerequisites: Junior classification; approval of instructor.

**316. Secondary School Physical Education. (3-0). Credit 3. I**

Class organization, control, and management; methods of presenting subject matter; special methods in activities. Prerequisites: Junior classification; approval of instructor.

**317. Coaching of Football. (1-3). Credit 2. II**

Teaching of fundamentals; individual techniques; training; offensive and defensive strategy; officiating.

**321. Coaching of Tennis. (1-3). Credit 2. I**

Analysis, theory and practice of tennis strokes; strategy; methods of coaching; organizing and conducting tournaments. Prerequisites: Junior classification; approval of the instructor. (Offered in 1963-64 and in alternate years thereafter.)

**325. Outdoor Activities. (2-0). Credit 2. II**

A course designed to acquaint the student with the function of the camp and outdoor activities as educational agencies through the medium of practical projects and activity, organization, problems, and modern programs in the various areas.

**423. Administration of Health and Physical Education. (3-0). Credit 3. II, S** †

Administrative problems involved in the coordination of the health, physical education, intramural, and athletic areas in a comprehensive program of physical education. Prerequisites: Biology 225; Health Education 415; Physical Education 213.

**425. Tests and Measurements. (3-0). Credit 3. I, II, S** †

Use, interpretation, evaluation, and administration of existing tests in health and physical education; application of elementary statistical procedures. Prerequisites: Health Education 415; senior classification.

**427. Remedial Exercises. (3-0). Credit 3. I**

Elementary techniques in diagnosing functional and structural defects; procedures of individual exercise with emphasis on preventive and remedial measures. Prerequisites: Biology 219, 220; approval of instructor.

**428. Corrective Therapy. (3-9). Credit 6. II, S**

This course is cooperative with the Veterans Administration Hospital and is taught at the VA Hospital in Houston. The course is taught for a six-week period and consists of theory and practice in corrective therapy procedures. Prerequisites: Physical Education 427; approval of Head of Department.

**450. Directed Teaching. (2-12). Credit 6. I, II**

Construction of lesson plans, observation and supervised practice teaching in public schools. Prerequisites: Physical Education 316; senior classification.

**481. Seminar. (1-0). Credit 1. I, II, S**

General discussion of professional ethics and current problems relating to health, physical education, and athletics. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Survey of Research. (3-0). Credit 3. S**

A study of published reports and research in the field of health and physical education. Prerequisite: Education 426 or Physical Education 425.

**603. Coaching and Officiating. (3-0). Credit 3. S**
Advanced coaching and officiating techniques in football, basketball, track, and baseball. Prerequisites: Teaching and coaching experience.

**610. Administration of Interschool Athletics. (2-0). Credit 2. S**
This course is designed for school superintendents, principals, and athletic directors. A study of the University Interscholastic League rules and regulations and the various problems confronting the school administrator in administration of the interschool athletic program.

**614. Philosophy and Principles. (3-0). Credit 3. S**
Divergent origins, leaders, conditions, and forces affecting the development of health and physical education. Critical analysis of objectives. Principles of education, psychology, and physiology, and their implications in health and physical education. Prerequisite: General prerequisite for minor. (Offered in 1963-64 and in alternate years thereafter.)

**622. Supervision of Health and Physical Education. (3-0). Credit 3. S**
Methods and policies of the school supervisor; conferences, planning and presenting the program, evaluating results, improving teachers-in-service. Prerequisite: Physical Education 423. (Offered in 1964-65 and in alternate years thereafter.)

**636. Advanced Tests and Measurements. (3-0). Credit 3. S**
Critical study of tests and measurements available; methods of constructing and evaluating new tests and measurements. Prerequisite: Physical Education 425. (Offered in 1964-65 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1. I, II, S**
General discussions of laws, legislative certification, professional ethics, and other current problems relating to health, physical education, and recreation. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**685. Problems. Credit 1 to 3 each semester. I, II, S**
Directed study of selected problems of health, physical education, and recreation not related to a thesis. Prerequisites: Graduate classification; approval of the instructor.

## Department of History and Government

Professor J. M. Nance,
Professors W. E. Benton, A. B. Nelson; Associate Professors J. T. Duncan, C. H. Hall, H. H. Lang, T. L. Miller, L. C. Taylor, Jr.; Assistant Professors A. C. Ashcraft, G. E. Bayliss, R. L. Harris, M. T. Kyre, Jr., H. M. Monroe, Jr.; Instructors C. E. Anderson, E. R. Arango, O. B. Faulk, P. A. Ford, W. A. Harrison, C. M. Hepburn, J. T. Macpherson, A. R. Stephens, N. R. Stout, A. G. Theoharis

### GOVERNMENT

**205. Government of the United States and Texas. (3-0). Credit 3. I**
The organization, functions, and nature of the national government; the rights and privileges of citizenship; the immigration and naturalization laws, all as closely related to the constitution as possible, are treated first. A similar treatment is then applied to the government of Texas. Open only to military juniors and seniors in agricultural education and industrial education.

**206. American National Government. (3-0). Credit 3. I, II, S**
The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible. Prerequisite: Sophomore classification.

**207. State and Local Government. (3-0). Credit 3. I, II, S**

The nature, organization, and general principles of local government in the United States with especial attention to these forms of government in Texas. Prerequisite: Government 206 or its equivalent. Required as condition to degree of all students who have not had at least three semester hours credit in military training before graduation.

**308. United States Constitutional Development. (3-0). Credit 3. II** †

A study of leading decisions of the Supreme Court. The various trends in our constitutional growth since 1789 are treated, as well as the expansion through judicial interpretation of the powers delegated to the national government. Some attention is given to legal terminology and to the composition and functioning of the national judiciary. Required of all pre-law students in three-year pre-law program. Prerequisites: Government 206; History 105.

**310. Comparative Government. (3-0). Credit 3. II** †

A survey of major European governments. Stress will be placed upon the parliamentary democracies of Great Britain, France, West Germany, and Italy. The dictatorships of the U.S.S.R. and Spain will also be considered. Governmental background, structure, and operation will receive attention. Prerequisite: Junior classification.

**315. American Political Parties. (3-0). Credit 3. I** †

A study of the organization, history, and functions of political parties, and the place they occupy in the operation of national, state, and local governments in the United States. Attention is concentrated on the two major political parties, but some attention is given third party movements. Prerequisite: Junior classification. (To be offered in 1963-64 and in alternate years thereafter.)

**320. Elements of Political Thought. (3-0). Credit 3. II** †

A study of ancient, medieval, and modern concepts of government as developed by the principal contemporary political writers, and as reflected in political institutions. Prerequisite: Junior classification. (To be offered in 1963-64 and in alternate years thereafter.)

**321. Local Government in the United States. (3-0). Credit 3. II** †

Development, structure, nature, and legal status of the local government pattern; counties, towns, townships, school districts, and other special districts and units of local government. Relationship of local units to metropolitan areas and to the federal and state governments; revenue problems, and analysis of proposals for reform and reorganization. Special emphasis placed on Texas local government patterns. Prerequisites: Government 206, 207. (To be offered in 1963-64 and in alternate years thereafter.)

**325. Introduction to Public Administration. (3-0). Credit 3. I** †

A survey of American public administration with emphasis upon the following major areas: development of public administration in the United States, theories of administrative organization, principles and methods of administrative management, executive leadership, interpersonal and intergroup relationships, levels of decision making, ethics and responsibility. Prerequisites: Government 206, 207.

**331. International Politics. (3-0). Credit 3. I** †

An analysis of the contemporary world from the point of view of the nation-state; political principles, problems, and factors involved in the foreign polices, and relations of the nation states, with special emphasis on the sources and use of national power and the difficulties in limiting the use of such power. Prerequisites: Six semester hours of government. (To be offered in 1964-65 and in alternate years thereafter.)

**333. International and Regional Organization. (3-0). Credit 3. II** †

Historical development of modern world-wide regional international organizations. Politics, structure, and functions of the United Nations; regional organizations, economic and political; international federalism; integration of Western Europe, Southeast Asia, Latin America, and the Middle East. Prerequisites: Government 206, 207. (To be offered in 1964-65 and in alternate years thereafter.)

**335. Government and Politics of Latin America. (3-0). Credit 3. I** †

The constitutional development, political institutions, and contemporary political problems of the principal Latin American countries, with special emphasis on the present day constitutions and government structure. Prerequisite: Six hours of government. (To be offered in 1963-64 and in alternate years thereafter.)

**436. Municipal Government. (3-0). Credit 3. I** †

Designed for students who may enter the municipal service as well as for those who desire only a general knowledge of city government. Urban growth; legal position of cities; forms of government; the mayor, council, city manager, and municipal courts; relation of city to state; the political process; municipal ownership; services; metropolitan problem; special reference to Texas cities. Prerequisite: Government 205 or 206. (To be offered in 1964-65 and in alternate years thereafter.)

**441. Public Personnel Administration. (3-0). Credit 3. II** †

The development of the merit system; problems of recruitment and selection; position classification and compensation; promotion; discipline, service ratings; and retirement. Selected cases in personnel management from the standpoint of the operating official and government. Prerequisite: Six semester hours of advanced government. (To be offered in 1963-64 and in alternate years thereafter.)

## HISTORY

**105. History of the United States. (3-0). Credit 3. I, II, S**

English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and the slavery problem; war for Southern independence. (See "Requirement in Government and History," page 103.)

**106. History of the United States. (3-0). Credit 3. I, II, S**

Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; World War I; reaction and the New Deal; World War II; contemporary America. Prerequisite: History 105.

**213. History of England. (3-0). Credit 3. I, II**

British, Saxon, and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament. Required in three-year pre-law program.

**214. History of England. (3-0). Credit 3. I, II**

Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the twentieth century; growth of the Empire until World War II. Required in three-year pre-law program. Prerequisite: History 213.

**217. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe in the Middle Ages. A survey of the development of European civilization from the decline of the Roman Empire to the Renaissance. The course is designed to give the student historical perspective as well as a basic historical knowledge of the period. Major topics include the Graeco-Roman heritage, the barbarian migrations, the growth and development of the church, the rise of capitalism, medieval society, and the origin of nationalism in Europe. Required of majors in history.

**218. Development of Europe. (3-0). Credit 3. I, II**
The history of western Europe from the Renaissance to the present. A survey of modern European civilization, dealing especially with the Renaissance and the Reformation, the Age of Reason and the French Revolution, the Napoleonic wars, the growth of nationalism and democracy in the nineteenth century, the causes and consequences of the two world wars and the rise of dictatorship. Required of majors in history. Prerequisite: History 217.

**302. Colonization of North America. (3-0). Credit 3. II** †
Geographic setting; early English, French, Dutch, Swedish discovery, conquest, and settlement, 1497-1763; colonial administration; colonial life; inter-colonial wars. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences.

**315. The United States, 1901 to the Present. (3-0). Credit 3. II, S** †
A study of United States history during the twentieth century. Emphasis is placed primarily on the development and application of progressive principles from the "square deal" of the first Roosevelt to include the subsequent "new deal" and "fair deal" of the Roosevelt and Truman administrations; secondary emphasis is on the international relations of the United States as the nation became a world power, moved from isolation to leadership and back, followed by the development of the "good neighbor" policy toward Latin-America and our participation in World War II. The United Nations and problems.

**318. International Developments since 1918. (3-0). Credit 3. I, II, S** †
A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question, and the clash of United States-Japanese policies. World War II; the conflict of ideologies.

**321. Europe, 1815-1870. (3-0). Credit 3. I** †
The Congress of Vienna and the reconstruction of Europe: the successive political changes in the major European countries in 1823, 1830, 1848, and 1870, together with the outstanding social, economic, scientific, and cultural developments in European life from 1815 to 1870. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. **(To be offered in 1963-64 and in alternate years thereafter.)**

**322. Europe, 1870-1919. (3-0). Credit 3. II** †
A treatment of the political, economic, social, intellectual, and cultural developments in Europe, 1870-1919, with special emphasis upon the diplomatic and military developments leading to World War I; World War I and the peace treaties. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. (To be offered in 1963-64 and in alternate years thereafter.)

**325. Trends in American History. (3-0). Credit 3. I, II, S**
The sources and development of leading American institutions constituting representative democracy, their influence upon our nation's development and upon the twentieth century world. Course stresses the institutional rather than the chronological and political aspects of the United States, endeavoring to present what has been well styled "The Epic of America." Students who have credit for History 105 or 106 may not receive credit for History 325. Required of all students offering only three semester hours in American history toward the legal requirement for a baccalaureate degree. Prerequisite: Sophomore classification.

**326. History of Texas. (3-0). Credit 3. I, II, S**
A history of Texas from the Spanish period to the present day. Stress will be placed upon the period of Anglo-American settlement, the revolution, the republic, and the development of the modern state. Prerequisite: Sophomore classification.

**331. Medieval Civilization. (3-0). Credit 3. I** †

History of medieval thought ranging from the influence of Plato and Aristotle to the age of Erasmus and Machiavelli. The course outlines the intellectual history of the Middle Ages and includes in broad outline the interests of man in philosophy, science, education, law, and religion. Prerequisite: Six semester hours of history.

**332. Renaissance and Reformation. (3-0). Credit 3. II** †

A study of the fifteenth and sixteenth centuries with emphasis upon the intellectual history of the era. Political ideas, art, and humanism of the Renaissance are stressed. The doctrinal controversy and the beliefs of Luther, Calvin, and Zwingli are emphasized in the Reformation. Prerequisite: Six semester hours of history.

**341. South America to 1825. (3-0). Credit 3. I** †

Establishment of Spanish and Portuguese dominion in South America; political history of South America from European exploration and settlement to independence; colonial institutions; commercial systems of Spain and Portugal; the independence movement to the founding of the republics. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. (To be offered in 1964-65 and in alternate years thereafter.)

**342. South America Since Independence. (3-0). Credit 3. II** †

Political history of the independent South American nations since independence with emphasis upon the ABC countries; economic, social, and cultural development; relations with Europe and the United States; participation in world affairs. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. (To be offered in 1964-65 and in alternate years thereafter.)

**375. Tudor and Stuart England. (3-0). Credit 3. I, S** †

Study of the changes in the social, economic, and religious organization of England from 1485 to 1689; developments in the international position of England; the rise of Puritanism; the conflict between crown and Parliament; the Interregnum, Restoration, and "Glorious Revolution." Prerequisites: Twelve hours in history, including History 213, 214 or History 217, 218. (To be offered in 1963-64 and in alternate years thereafter.)

**411. The Old South. (3-0). Credit 3. I, S** †

A history of the antebellum South. Emphasis will be placed on the following topics: physical bases of Southern regionalism; Southern alignments on national issues; the slavery-plantation economy and society of the Old South; secession and formation of the Confederacy. Prerequisite: History 106 or 325.

**412. Civil War and Reconstruction. (3-0). Credit 3. II** †

Survey of the background and causes of the war; military, political, economic, and diplomatic aspects of the war; life behind the lines; reconstruction and post-war adjustments, 1861-1877. Prerequisite: Twelve hours of history, or six hours of history and six hours in sophomore courses in other social sciences. (To be offered in 1964-65 and in alternate years thereafter.)

**413. Mexico and Spanish North America, 1492-1821. (3-0). Credit 3. I** †

Exploration and establishment of Spanish dominion in the West Indies, Central America, and Mexico; the northward advance of the Spanish frontier under the Hapsburgs and early Bourbons; Spanish colonial system and institutional development; the independence movement. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. (To be offered in 1963-64 and in alternate years thereafter.)

**414. History of Mexico, 1821 to the Present. (3-0). Credit 3. II** †

The political, economic, and social development of Mexico since independence and her relation to other world powers. Prerequisites: Twelve semester hours of history, or 6 hours of history and junior classification. (To be offered in 1963-64 and in alternate years thereafter.)

**415. The Institutional Background of Texas, 1519-1845. (3-0). Credit 3. I, S** †

A study of the history of Texas from the Spanish period to annexation to the United States. Particular stress is placed upon the Spanish legal and administrative system. The Mexican administrative system, the establishment of Anglo-Americans in Texas, the revolution, the republic, and the fight for annexation. In each of these topics emphasis is placed upon principles and developments of this period which are reflected in the state's present-day society. (To be offered in 1963-64 and in alternate years thereafter.)

**416. Texas Since 1845. (3-0). Credit 3. II, S** †

A history of Texas since annexation. Careful attention is given to social, cultural, economic, and political developments, and to the place of Texas in national affairs. (To be offered in 1963-64 and in alternate years thereafter.)

**421. Far East, 1895 to Present. (3-0). Credit 3. II** †

Brief survey of the government, politics, and civilizations of China, Japan, India, Pakistan, and Southeast Asia; the political picture in the Far East at the end of the Sino-Japanese War, 1895; spheres of influence; Boxer Rebellion; colonialism and nationalism; rise of republicanism; Far East in two world wars; international developments in the Far East; Korean War. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1963-64 and in alternate years thereafter.)

**422. International Rivalry in the Gulf-Caribbean Area, 1840 to the Present. (3-0). Credit 3. I** †

Background of Spanish colonial policy, with British, French, and Dutch intrusion; conflict of interests; influence of islands on mainland settlement. Early United States interest; Monroe Doctrine and its extension; vital treaties with Colombia and Great Britain. European interests in the islands, Central America, Mexico, and Venezuela. Later policies of the United States, rise of Pan-Americanism and Pan-Hispanism. First reciprocal trade treaties and rise of United States imperialism. Policy of "the good neighbor" under Wilson and Roosevelt. Recent progress of Pan-Americanism toward western hemisphere solidarity. (To be offered in 1963-64 and in alternate years thereafter.)

**423. American Foreign Relations. (3-0). Credit 3. I, S** †

The history of the United States foreign relations and development of our leading foreign policies to 1868. The Revolution and alliance with France; the development of isolation and neutrality; neutral rights and the War of 1812; nationalism and the Monroe Doctorine; Manifest Destiny and its consequences; diplomacy of the Civil War; the Monroe Doctrine applied to France in Mexico; the "Alabama" claims arbitration. (To be offered in 1964-65 and in alternate years thereafter.)

**424. American Foreign Relations. (3-0). Credit 3. II, S** †

The history of the United States foreign relations and development of our leading foreign policies, 1875 to the present; America becomes a world power; imperialism; World War I and the failure of neutrality; the League of Nations and its desertion; Pan-Americanism; failure of disarmament and rise of aggression; neutrality fails again; World War II; United Nations and problems. (To be offered in 1964-65 and in alternate years thereafter.)

## FOR GRADUATES

**607. The United States, 1763-1800. (3-0). Credit 3. I, S**

A study of the causes of the American Revolution, the Revolution, the Articles of Confederation, and final union under the Constitution. Careful attention will be given economic and social developments as well as political developments. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1963-64 and in alternate years thereafter.)

**609. American Historical Writing. (3-0). Credit 3. I, S**

A survey of American historical writing and historiography from 1607 to the present, with some attention to bibliographical guides to sources and literature of the United States. Prerequisites: Twelve hours of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**610. The Trans-Mississippi West. (3-0). Credit 3. II**

A study of the West in American history. The course will emphasize political, economic, social, and cultural influences of the frontier. Extensive reading will be required. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1963-64 and in alternate years thereafter.)

**611. American Leaders. (3-0). Credit 3. II, S**

The personalities and contributions of thirty-six American leaders from Samuel Adams to Dwight Eisenhower. Prerequisites: Twelve hours of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**612. The French Revolution and Napoleon. (3-0). Credit 3. II**

Detailed consideration of the decline of the ancient regime, the influence of the Encyclopedists, the causes and course of events during the revolution; and a study of the Napoleonic Era. Critical evaluation of the source material as well as interpretation of the historical importance of the period is stressed. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1963-64 and in alternate years thereafter.)

**615. Growth of Spanish Institutions in America, 1492-1857. (3-0). Credit 3. I**

A study of the growth of political, economic, religious, military, and related institutions, both in theory and in practice, as proposed, developed, and applied in the Spanish-American colonies and nations, 1492-1857. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1963-64 and in alternate years thereafter.)

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual instruction in selected fields of history. The course will stress reports and wide reading in the field selected. Prerequisites: Eighteen hours of history and government; graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research. Credit will be given only upon acceptance of completed thesis. Prerequisites: Twelve hours of advanced history; graduate classification.

## Department of Industrial Education

Professor C. H. Groneman,
Professor L. V. Hawkins; Associate Professors E. R. Glazener, L. B. Hardeman; Assistant Professors C. A. Bertrand, J. L. Boone, Jr.; Instructors W. T. Brooks, K. M. Chambliss

**105. Woodcraft. (1-5). Credit 3. I, II**

A comprehensive study of woods, wood products, and wood industries; including growth and botanical structure, production and uses, design, construction, and finishing.

**106. Sheet Metal. (1-5). Credit 3. II**

A study of industrial practices in developing, laying-out, and fabricating sheet metal products. Problems involving parallel-line, radial-line, and triangulation will be provided.

**107. Industrial Materials and Manufacturing Processes. (2-3). Credit 3. I, II**

A comprehensive study of the production, processing, and use of numerous raw materials of industry. Laboratory work will consist of problems involving research and experimentation.

**204. Development and Practice in Industrial Education. (3-0). Credit 3. II**

The history and development of industrial education, its meanings and objectives. Applications of vocational preparation for industry, vocational practices, and developments within industry.

**205. Ornamental Iron. (1-5). Credit 3. I**

A study of metals and metal products; including the alloying and proper use of ferrous and non-ferrous metals. Problems involving casting, spinning, machining, forging, welding, tubular construction, and electroplating are required.

**301. Methods of Teaching and Class Management. (2-0) or (3-0). Credit 2 or 3. I**

An introduction to the fundamentals of teaching as applied to industrial subjects; the management of the class, equipment, and supplies.

**304. Applied Industrial Electricity. (2-3). Credit 3. I, II**

A theoretical and practical study of electrical circuits, motors, generators, transformers, lighting, controls, and instruments. Laboratory experiences consist of experiments and projects in circuits and machines. Prerequisite: Physics 202.

**308. A Study of Modern Industries. (3-0). Credit 3. I**

The political, historical, and geographical factors which have a direct influence upon the development and distribution of industries. Specific studies of individual industries are made, such as iron and steel, paper, automobiles, petroleum, cement, leather, plastics, and textiles. Essential features of these industries are considered: location, machinery, power, raw material, market, labor.

**310. Course Making. (2-0). Credit 2. II**

Methods of outlining courses of study to meet the needs of the different types of classes. Each student will make a complete course for some particular subject.

**323. Methods of Teaching Mechanical Drawing. (1-3). Credit 2. I**

The student should have completed courses equivalent to Engineering Graphics 105, 106 before attempting this course. Analysis of problems and the selection of instructional material and methods of presentation for general drafting.

**326. General Metalwork. (1-5). Credit 3. I, II**

The designing and construction of power machinery including the development of plans for procedure, jigs, and fixtures. A study is made of materials and industrial processes and procedures of the foundry, welding, and machine shop. Prerequisites: Mechanical Engineering 202, 310.

**327. Industrial Arts Handcraft. (1-5). Credit 3. I**

Development and preparation of instructional materials; designing and building of teaching type projects and problems in such materials as leather, bookbinding, lapidary, and other handcraft activities. Prerequisite: Nine hours of industrial laboratory courses.

**328. Industrial Accident Prevention. (3-0). Credit 3. I, II**

Analysis of fundamentals of accident prevention and their application to industrial supervision and management. Prerequisite: Junior classification.

**332. Plastics and Ceramics. (1-3). Credit 2. I**

Sources, manufacture, supply, and uses of plastics and ceramic materials; designs appropriate for plastics projects; essential processes in fabrication of plastics and ceramic objects. Prerequisite: Nine hours of industrial laboratory courses.

**334. Upholstery. (1-3). Credit 2. II**

Instruction in the essentials of upholstery processes, including the design and construction of frames and foundations. Prerequisite: Industrial Education 105.

**336. Design in the Arts and Crafts. (1-3). Credit 2. II**

Analysis and solution of design problems applicable to the arts, crafts, and industrial products as related to Industrial Education. Prerequisites: Engineering Graphics 105, 127; Industrial Education 105; Mechanical Engineering 106, 201, 202, 309.

**404. Visual Aids for Industrial Subjects. (1-2). Credit 2. I** †

This course is designed to develop an understanding of, need for, construction of, and use of visual aids for instruction in industrial subjects. Student activity consists of determining values of color in aids, use of projection and television equipment, and a variety of other audio-visual media.

**406. Industrial Guidance. (2-0). Credit 2. I** †

A study of the instruments and techniques of industrial guidance, its relation to education and industry, its meaning and purpose, and the analysis of methods of investigation and guidance procedures.

**409. Methods of Introducing Industrial Organization and Management into Industrial Schools. (2-0). Credit 2. S** †

The management of modern industrial enterprises and the possible adaptation to industrial programs.

**419. Laboratory of Industries Methods. (1-3). Credit 2. II** †

The student will make a study of the units of industries as generally recommended for public school industrial arts and will select, plan, and design problems and projects to meet these requirements.

**420. Follow-up, Visitations, and Coordination in Part-Time Schools. (2-0). Credit 2. S** †

Selecting occupations suitable for young people to learn, placing students in suitable employment on a part-time basis, and coordinating their school duties with their work activities.

**423. Analysis Procedure. (1-2). Credit 2. I, II** †

Analysis is made of occupations to obtain content for instructional information. Jobs and operations are studied to determine the order and content of operation, job description, job evaluation, and job safety.

**424. Organization of Instructional Material. (1-2). Credit 2. S** †

A study will be made of published material available in the student's occupational field. Those parts found suitable for vocational classes will be indexed and organized for class use. Types of instruction sheets found necessary for efficient teaching will be written.

**427. Driver Education. (1-6). Credit 3. II**

A study and the application of state and federal regulations and policies governing the efficient and safe operation of automotive vehicles in traffic.

**429. Foremanship and Supervision. (3-0). Credit 3. I**

A study of supervisory duties and responsibilities in an industrial organization and procedures for meeting these responsibilities. Prerequisite: Senior classification.

**438. Industrial Safety. (2-3). Credit 3. II**

Continuation of Industrial Education 328. This course will include analyses of various types of accident prevention; organizations and programs of typical industrial safety departments; control of environmental hazards, and the application of safety engineering principles in design and specifications. Prerequisites: Industrial Education 328; Industrial Engineering 302; and either Industrial Education 429 or Industrial Engineering 401 or registration therein.

**442. Supervised Teaching in Industrial Arts. (2-12). Credit 6. I, II**

Observation of, and participation in, the activities of a typical industrial arts classroom. The student will prepare lesson plans and present demonstrations to pupils in industrial arts in the public schools. Prerequisites: Industrial Education 204, 301; senior classification.

**444. Industrial Distribution. (3-0). Credit 3. I, II**

A seminar approach to the study of the problems of industrial distribution with the assistance of representatives from the Southern Association of Distributors. Prerequisite: Junior classification.

**447. Electricity and Electronics. (2-3). Credit 3. I, II**

A continuation of Industrial Education 304. Laboratory experiences in the construction and operation of electronic devices, including power supplies, receivers, amplifiers, and electronic controls. Prerequisites: Industrial Education 304; Physics 202.

**481. Seminar in Industrial Education. (1-0). Credit 1. I, II**

General discussion of laws, legislation, certification, professional ethics, and other current problems relating to industrial and teaching fields. Prerequisite: Senior classification.

## FOR GRADUATES

**601. History of Industrial Education. (2-0). Credit 2. I, II, S**

A study of leaders, movements, and agencies with special emphasis on the economic, social, and philosophical factors which have contributed to the development of industrial education in the United States.

**602. Industrial Arts Administration and Supervision. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of industrial arts.

**603. Administration and Supervision of Vocational Industrial Education. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of vocational industrial education.

**604. Industrial Programs for Junior Colleges and Technical Schools. (2-0). Credit 2. I, II, S**

A study of the kinds, purpose, size, accreditation, growth, and teaching problems of the junior colleges, technical institutes, and adult schools, with particular emphasis on organization and presentation of industrial subject material in these schools.

**605. Problems in Industrial Safety. (2-0). Credit 2. I, II, S**

Basic reasons for accidents; prevention of industrial accidents; qualifications and duties of safety consultants; methods of making investigations; making investigations and how to prepare safety reports.

**606. Organization of Industrial Arts Department. (2-0). Credit 2. I, II, S**

Problems in determining the type and size of industrial arts programs for the various types and sizes of schools with plans for the organization of each.

**609. Methods of Teaching High School Drawing. (2-3). Credit 3. I, II, S**

A survey of the field of drawing. The designing and organizing of problems and teaching devices.

**614. Guidance Seminar. (2-0). Credit 2. I, II, S**

The organization of occupational information; educational and vocational guidance; counseling case problems. Prerequisite: Industrial Education 406 or equivalent.

**616. Methods of Teaching Industrial Arts in Secondary Schools. (2-0). Credit 2. I, II, S**

Selecting and organizing instructional material for problems in a particular industrial activity.

**618. Tests and Measurements in Industrial Education. (2-0). Credit 2. I, II, S**

A study of testing and measuring devices and their application to industrial education subjects.

**619. Related Subjects in Part-Time Cooperative Programs. (2-0). Credit 2. I, II, S**

The organization and presentation of content material necessary in part-time cooperative programs, and the direction of the study of the students engaged in such programs.

**621. Philosophy of Vocational Education. (2-0). Credit 2. I, II, S**

The basic principles involved in the development and operation of industrial education programs under the State and Federal vocational laws.

**622. Philosophy of Industrial Arts Education. (2-0). Credit 2. I, II, S**

The principles involved in the development and operation of industrial arts courses and their purpose and function in the field of general education.

**623. Vocational Guidance Procedures. (3-0). Credit 3. I, II, S**

A workshop approach to the study of vocational guidance, programs, relationships, group techniques, and methodology of the clinical approach.

**626. Classroom Management and Shop Organization. (2-0). Credit 2. I, II, S**

The organization of routine procedures to facilitate teaching; setting up roll-checking devices, issuing procedures for tools and materials, keeping material inventory, using assignment charts and progress charts, using student leadership in routine non-teaching class and shop routine, and keeping records.

**627. Teacher Training for Local Supervisors of Trade and Industrial Classes. (2-0). Credit 2. S**

A discussion of problems related to the administration of industrial education programs, in-service training, and upgrading of programs on the local level. Methods of organizing and conducting teacher improvement programs; preparation and correlation of instructional material.

**628. Organization of Vocational Industrial Schools and Classes. (2-0). Credit 2. S**

Methods of making surveys, determining the needs for various industrial education programs, and the organization of the curriculum and classes according to State certification requirements.

**630. Auto Mechanics. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to the economic selection, operation, and maintenance of internal combustion power plants.

**631. Electricity. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to practical theories and their application to electrical units within a high school program.

**632. Cabinet Making. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern methods of kiln drying, veneer construction, upholstery, and fabrication within the furniture industry.

**633. Machine Shop. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern practices and problems in the teaching of advanced machine shop.

**634. Ornamental Metal Work. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to mild steel and tubular metal.

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislation, certification, professional ethics and other current problems relating to the industrial education teaching profession.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed to enable graduate majors to undertake and complete with credit limited investigations which do not fall within the thesis research and which are not covered by any other course.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Industrial Engineering

Professor A. R. Burgess,
Professors J. P. CoVan*, S. A. Wykes; Associate Professors D. E. Cleveland,
R. L. Smith, Jr.; Assistant Professors D. D. Drew, R. E. Kilmer, J. M. Nash;
Instructor R. L. Street; Lecturers C. E. Bullinger, L. P. Robinson

**202. Introduction to Industrial Engineering. (2-0). Credit 2. II**

The place of industrial engineering in the factory organization. Relationship of industrial engineering to management, purchasing, cost control, inspection, product development, and maintenance. Historical origins and development of the profession.

**302. Production Engineering. (1-2). Credit 2. I, II**

A coordinated study of manufacturing processes and equipment; operation sequence planning; economic aspects of equipment selection. Tooling and processing a product from product design to final assembly for quantity production. Emphasis is placed on latest developments in manufacturing techniques. Prerequisites: Mechanical Engineering 201, 310.

**401. Survey of Industrial Engineering. (3-0). Credit 3. I, II, S** †

A survey of the industrial engineering field; administrative decisions, layout of equipment, materials handling, production control, quality control, motion and time study, cost determination, wage plans, job evaluations, operations research, use of computers by management. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

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*On leave of absence from 2-1-62 to 1-31-64.

**403. Production Management. (3-0). Credit 3. I, II**

A survey course in the principles of production for business administration majors. Prerequisite: Senior classification in business administration.

**404. Motion and Time Study. (2-3). Credit 3. I, II** †

Standardization of job conditions; methods improvement and motion economy; use of flow process charts and diagrams, micromotion analysis of motion pictures, simo-charts, multiple-activity charts; allowances; rating methods; taking time studies; use of standard data and development of time formulas. Prerequisite: Junior classification in engineering or business administration.

**412. Labor and Industry. (3-0). Credit 3. I, II** †

A brief review of the history of organized labor; critical study of fundamental Federal and State laws governing labor-management relations; study of current interpretations of labor laws, controversial labor-management issues and their solutions. Prerequisite: Senior classification in engineering or business administration, or approval of Head of Department.

**414. Statistical Control of Quality. (2-3). Credit 3. I** †

The engineering aspects of controlling quality through the use of statistical methods. Frequency distributions, control charts for variables, control for fraction defective and defects per unit. Sampling inspection plans. Design of specifications; tolerance systems and gaging. Administration of inspection. Prerequisite: Junior classification in engineering.

**415. Production Control. (1-3). Credit 2. I** †

The planning and control of production; operation analysis; routing; scheduling; dispatching; use of visual production charts and boards; inventory control; accumulation of material requirements; design of production control forms; forecasting production requirements; economic lot size; controls for job order, repetitive cycle, and straight line production. Critical path techniques. Prerequisite: Industrial Engineering 302, registration in 404.

**416. Factory Layout. (1-6). Credit 3. II** †

The layout of a complete factory for a selected product. Use of machine templates and models; design of materials handling systems; machine erection; auxiliary services; design of storerooms; loading docks; choice of building types; machine selection; estimate of unit costs; estimate of capital requirements; personnel organization; safety considerations in plant layout. Prerequisites: Industrial Engineering 404, 415.

**420. Manufacturing Costs. (3-0). Credit 3. II** †

The study of modern techniques used by engineers for controlling manufacturing costs. Computing probable returns from investments in new plants and new equipment. Use of break-even charts, profit graphs, machine replacement studies, comparison of alternative methods, standard costs, and budgeting, to control manufacturing costs. Introduction to operations research. Prerequisite: Industrial Engineering 414 or registration therein.

**453. Tool Engineering. (2-3). Credit 3. I**

Principles of selection and design of tools, jigs, fixtures, and gages. Economic considerations in the choice of tooling methods. Estimating tooling costs. Dimensioning and tolerances. Methods of locating, clamping, and feeding. Principles of automation. Graphical solution of tool design problems. Numerical control of machine tools. Prerequisite: Civil Engineering 305; Industrial Engineering 302; registration in Mechanical Engineering 337.

**458. Programming of Digital Computers. (3-2). Credit 4. I, II, S** †

Operation of digital computer; flow charts; sub-routines; library programs; floating point; multiple precision; error analysis; optimum coding; symbolic coding; interpretive coding; automatic coding, practical applications. Prerequisite: Senior classification in engineering or physical sciences or approval of the Head of the Department.

**481. Seminar. (0-2). Credit 1. II**

Investigation and report by students of topics of current interest in Industrial Engineering. Experimental studies are made wherever feasible.

**485. Special Problems in Industrial Engineering. Credit 1 to 3. I, II, S**

A course which permits work on a special project in industrial engineering. Project must be approved by the Head of the Department. Prerequisite: Senior classification in industrial engineering.

## FOR GRADUATES

**601. Industrial Surveys. (2-0). Credit 2. II**

Engineering problems related to industrial investigations, reports on organizations, personnel, capital equipment, financial policies, market, etc. Prerequisites: Industrial Engineering 415, 416.

**603. Human Relations in Industry. (4-0). Credit 4. I**

Causes of misunderstandings between management and labor; interdepartmental relations; conditions which influence the attitudes and productivity of the workers; principles of leadership; critical study of current labor-management problems. Direct worker incentive, seasonal bonuses, quality incentives, profit sharing plans for executives, profit sharing for wage earners. Prerequisites: Industrial Engineering 404, 412.

**604. Advanced Time and Motion Studies. (1-6). Credit 3. I**

Advanced methods in time and motion study; balancing operations in a group or assembly line; learning curves; work sampling; memomotion and chronocyclegraph studies; fatigue effects; determination and application of elemental time data; statistical methods in time study. Prerequisite: Industrial Engineering 404 or the equivalent in practical time study experience in industry.

**608. Industrial Case Analysis. (3-0). Credit 3. II**

Practice in the application of principles to the solution of actual case problems involving broad management decisions. Special attention is given to problems indigenous to Texas industry. Prerequisite: Graduate classification in industrial engineering or approval of Head of Department.

**614. Advanced Quality Control. (3-3). Credit 4. I**

Advanced statistical methods applied to quality control problems; significance tests; correlation analysis; sequential sampling; analysis of variance; design of engineering experiments; response surface techniques. Prerequisite: Industrial Engineering 414.

**615. Production and Inventory Control. (3-3). Credit 4. II**

Recent developments in the techniques used to control inventories and production by means of statistical analysis of the problems, simulation techniques, and mechanized execution of the inventory and production control functions. Prerequisites: Industrial Engineering 415; graduate classification in industrial engineering or approval of Head of Department.

**620. Principles of Operation Analysis. (4-0). Credit 4. II**

Use of mathematical models in making decisions; optimizing over-all policies; probability methods, linear programming; transportation models; queing theory; learning curves; information theory; Monte Carlo methods; use of high speed computers for managerial control. Prerequisites: Industrial Engineering 420, 614.

**621. Computer Methods in Industrial Engineering. (2-3). Credit 3. I**

Principles and applications of computers to the solution of various industrial engineering problems. May not be taken for credit with Industrial Engineering 615 and 620. Prerequisites: Industrial Engineering 458; graduate classification in engineering or computer science.

**641. Computer Languages. (2-3). Credit 3. I**

A study of design and use of computer oriented and problem oriented languages for digital computers. Prerequisites: Industrial Engineering 458; Mathematics 417.

**642. Computer Methods in Applied Sciences. (2-6). Credit 4. II**

Techniques of analysis and programming required to utilize a stored program digital computer for solution of some typical physical systems. Prerequisites: Industrial Engineering 458; Mathematics 609.

**643. Logic of Information Processing. (2-6). Credit 4. II**

Principles and application of digital computers to problems of data reduction, information retrieval, and large scale commercial data processing problem. Prerequisite: Industrial Engineering 641.

**651. Tool Design. (3-3). Credit 4. II**

Design of automatic machine tools; tracer and director control of tool paths; automatic feeding, holding, indexing and ejection of work pieces; tool replacement analysis. Study of cutting forces, workpiece and fixture distortion. Automatic inspection and sorting, assembly, and packaging. Prerequisite: Industrial Engineering 453.

**681. Seminar. (2-0). Credit 2. II**

Group study and discussion of current developments in industrial engineering practices as reported in the literature and as presented by representatives from industry. Prerequisite: Graduate classification in industrial engineering.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in industrial engineering.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in the industrial engineering field; subject to meet the needs of the individual student.

## Department of Journalism

Professor Delbert McGuire;
Associate Professor J. C. Merrill, Jr.; Assistant Professor H. O. Ritter;
Instructor G. M. Horton

**102. Communications Media and Principles. (2-0). Credit 2. I, II**

An introductory survey of mass communications media, their purpose and methods of operation. Designed to give the journalism major a panoramic view of the field to help him to select an area of emphasis, and the non-journalism student an understanding of the importance of communications media in modern society and how they affect his life.

**201. News Writing. (2-3). Credit 3. I**

Beginning reporting; study of types of news; leads; body treatment of the story; feature in lead; facts; background and practice in writing straight news story. Prerequisite: Knowledge of typing.

**202. Beginning News Reporting. (2-3). Credit 3. II**

Study of news sources; style; interviewing; news analysis and discussion; handling of various types of news; emphasis on clear writing; practical reporting experience. Prerequisite: Journalism 201.

**300. Summer Practice. Ten weeks; required; no credit. S**

Summer practice in newspaper, magazine, or other communications office, as approved by the Department Head. Required previous to registration for fourth year. Prerequisite: Junior classification.

**304. Feature Story Writing. (2-2). Credit 3. I**

The writing of magazine and feature stories; types of feature articles; sources; titles; markets; slanting articles for particular markets; style, word usage; beginnings, illustrations.

**306. Newspaper Production and Management. (2-2). Credit 3. II**

The business of managing a newspaper; the community newspaper; study of the weekly and small town daily newspaper as a service organization; social responsibilities; influence of the community; mechanics of printing; managership; business side of conducting a paper. Prerequisite: Journalism 202.

**307. News Editing. (2-3). Credit 3. I**

The editing of news; intensive training in publication style, news evaluation, copy reading mechanics and techniques, headline writing and proofreading; provides understanding of journalistic responsibilities, ethics, laws of communication and the need for accuracy. Prerequisite: Journalism 202.

**308. Newspaper Advertising. (2-3). Credit 3. I**

Advertising layout and copy for newspapers and other publications; intensive practice in newspaper layouts; writing of retail copy; servicing of newspaper accounts. Prerequisite: Approval of instructor.

**309. Advertising Copy, Layout and Production. (2-3). Credit 3. II**

Application of tested advertising methods to the preparation of merchandising copy; layout design; and production of publication advertising. Sales appeals; attention factors, layout planning, illustrations, copy writing, copy testing, and production methods and problems. Prerequisite: Journalism 308.

**311. Radio and Television News Writing. (2-2). Credit 3. II, S**

Study and analysis of basic methods of writing for radio and television; special emphasis on techniques required in processing news copy; pictures and film. Thorough groundwork in fundamentals of radio and television news style; guidance in newsroom operation, getting the story, filming the news; scripting and editing, and handling equipment.

**315. Photography. (1-3). Credit 2. I, II, S**

Fundamentals of photographic theory and practice; cameras, lenses and shutters; light meters; properties of photographic film and paper; exposure and development of the negative; black and white printing processes; use of filters; lighting (natural, flash, and flood). Emphasis on photography as a medium of communication.

**321. Industrial Journalism. (2-2). Credit 3. I, II, S**

A study of the technique of writing technical articles and reporting news related to engineering, industry, science, and other specialized interests; preparation of fact articles for technical and trade journals.

**406. Publicity and Public Relations. (3-0). Credit 3. II** †

Practical analysis of the various fields of publicity and public relations. Students make surveys and perform laboratory work on actual projects. Theory and practice in various aspects of functioning publicity, including news writing, advertising, and radio.

**409. History and Principles of Journalism. (3-0). Credit 3. I**

Development of American journalism from colonial times to the present, projecting the press as an institution against the background of the economic, social, and political history of the nation. Includes ethics of the profession.

**410. Publications Production and Graphic Arts. (2-3). Credit 3. II**
A brief history of printing; practical design, layout, and editing of publications with laboratory practice in copy and picture selection and editorial supervision. Prerequisite: Journalism 307.

**412. Editorial Writing. (3-0). Credit 3. II**
The writing of editorials; editorial page; editorial campaigns; what constitutes editorial policy; ethics in editorial writing. Prerequisite: Journalism 304.

**415. Agricultural Journalism. (2-2). Credit 3. I, II, S**
The principles of newspaper writing; especially the preparation of material for agricultural papers and country weeklies; the part a country paper should play in country development; in the laboratory work, opportunity is given for actual writing for newspapers and farm journals. The Information Office of the College and the Information Department of the Extension Service are cooperative in the course.

**418. Reporting of Public Affairs. (2-2). Credit 3. I**
This course will include study and practice in reporting crime, the courts, and governmental activities with emphasis on interpretation of these news areas. Prerequisite: Journalism 202.

**420. Law of the Press. (3-0). Credit 3. II** †
This course will include a detailed study of the laws of publication and consideration of defamation, sedition, privilege, and ethics for the news media. It will include sections of study on general laws of the United States and on the individual states with emphasis on Texas. Prerequisite: Journalism 307, or approval of the Head of the Department.

**462. High School Journalism and Publications. (3-0). Credit 3. S** †
Problems of advising and sponsoring school newspapers and yearbooks; the school publication as a public relations tool; selecting and training the staff; financing school publications; planning content of high school journalism course. Prerequisites: Twelve semester hours of English; approval of Head of Department.

**465. International Communications and Propaganda. (3-0). Credit 3. I**
Study of communication problems and practices of the major nations of the world, with emphasis on the theory and functioning of the press under fascism, communism, and democracy; problems of international news distortion and propaganda; the place of the mass media in international relations. Prerequisites: Senior classification; approval of the Head of the Department.

**466. Techniques of Mass Communications. (3-0). Credit 3. II, S**
Survey of the methods of research in mass communications. Directed reading and discussion of outstanding professional literature in the field of journalism, and the analysis of major issues in contemporary journalism. Prerequisites: Senior classification; approval of the Head of the Department.

**485. Problems. Credit 1 to 4 each semester. I, II, S**
Research problems related to the communications field. Individual work, fitted to the special needs of the specific student as determined by his interests and aptitude.

## Liberal Arts

**201. Survey of Music Literature. (1-2). Credit 2. I, II, S**
A study of various types and styles of music literature. Lectures supplemented by listening. Music illustrations selected primarily from standard concert repertoire. For the music listener with little or no formal training in music.

**301. Introduction to Philosophy. (3-0). Credit 3. I**

An introduction to the nature of philosophic inquiry; theories of reality and of knowledge; including idealism, naturalism, and pragmatism; the relation of philosophy to religion, science, history, politics, and education. The aim is to stimulate thinking about problems of conduct and to develop principles and methods of passing judgment on current social issues. Prerequisite: Junior classification.

**304. Philosophies of Life. (3-0). Credit 3. II**

A survey including the biographical and historical backgrounds of the philosophies of the major philosophical thinkers from Socrates to Russell, and of their influence upon the thinking of mankind; incidental consideration of the ideals and values involved in moral, religious, esthetic, and scientific points of view.

**311. Use of Library Resources. (0-2). Credit 1. I, II**

A course designed to develop in students skill in the use of library resources at the upper level. Emphasis placed on specialized reference tools. Prerequisites: Completion of sophomore English; junior classification.

## Department of Marine Engineering

Capt. Bennett M. Dodson, USN (Retired), Superintendent

**102. Orientation. (0-2). Credit 1. I**

An introduction to basic marine engineering systems. A general description of the shipbuilding industry is related to the steamship industry. The career of an engineer officer is surveyed.

**200. Basic Operations. Credit 4. S**

This course represents the practical application of the student's classroom studies while at sea in the training ship during the sea training period. The student is required to complete several projects relating to the engineering plant of the ship.

**201. Marine Engineering Mechanics. (3-0). Credit 3. I**

The application of the principles of mechanics to elementary problems of marine engineering design. Topics include: forces and couples, analysis of structures and friction; principles of kinetics and kinematics.

**203. Engineering Laboratory. (1-3). Credit 2. I**

A study of pipe and valve standards; packing and gasket material; gearing and bearings; use of brass and copper service tubing; silver brazing techniques; corrosion controls in heat exchangers.

**204. Engineering Laboratory. (1-3). Credit 2. II**

An academic and practical study of the various marine power systems in use today and some future developments. Visits to various ships in Galveston harbor and to the local shipyard will be scheduled.

**300. Intermediate Operations. Credit 4. S**

The training program for the second sea training period. Sea projects are required of each student under the supervision of the officer-instructors.

**301. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. I**

The application of principles of fluid statics and dynamics to marine engineering problems. A study of the fundamental laws relating to heat flow; characteristics of pumps; topics in compressible flow.

**302. Engineering Laboratory. (0-3). Credit 1. II**

A demonstration of the basic concepts of fluid mechanics; calibration of flow meters, centrifugal pumps, orifice and weir flow. Additional practice is given in the principles and operations of power machinery.

**303. Marine Thermodynamics. (3-0). Credit 3. I**

Energy concepts and the first law of thermodynamics. The Carnot principles and reversible cycles. The properties and processes of vapors; vapor power cycles and vapor refrigeration cycles.

**304. Marine Thermodynamics. (3-0). Credit 3. II**

Properties and processes of perfect gases, gas compression cycles, gas power cycles, the air refrigeration cycle, and processes involving mixture of gases and vapors.

**305. Strength of Materials. (3-0). Credit 3. II**

The fundamental principles underlying the analysis and design of machine members subjected to various combinations of loading. Emphasis is given to the theoretical and empirical basis for material specification formulas as found in the United States Coast Guard Marine Engineering Regulations.

**306. Marine Refrigeration and Air Conditioning. (2-2). Credit 3. II**

The theory and practice of mechanical refrigeration. Specific topics include: thermodynamics of the Reverse Carnot cycle, vapor compression cycles; thermal, physical, and chemical properties of refrigerants. Descriptions of shipboard ventilation and air conditioning for passenger spaces and cargo hold conditioning.

**307. Electrical Circuits. (2-3). Credit 3. I**

A study in fundamental electrical theory as it applies to an understanding of the behavior, the mode of operation, the applications, and the maintenance of electrical equipment as used aboard ship. Measurements of the circuit phenomena, including fundamental amplifiers and rectifiers.

**308. Electrical Machinery. (2-3). Credit 3. II**

A study of the principal types of electrical machines aboard ship, including their characteristics, applications, and control devices. Laboratory work includes actual operation and testing of electrical machinery and equipment of the type installed aboard ships.

**331. Theory and Application of Electron Tubes. (3-3). Credit 4. I**

A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. A survey is made of electronic devices found aboard ship with concentration on maintenance and repair.

**400. Advanced Operations. Credit 4. S**

The training program for the third sea training period. At the end of this period each student will have completed approximately 36 weeks aboard ship while on sea training periods. He will have achieved the knowledge and will have demonstrated his ability to take complete charge of a modern marine power plant while underway at sea.

**401. Nuclear Propulsion I. (3-0). Credit 3. I**

A study of reactor mechanics with emphasis placed on fluid hydraulics, reactor core design, reactor fuels and their properties, shielding, construction and operation of related auxiliary machinery.

**402. Diesel Engineering. (2-2). Credit 3. II**

Basic principles of the two and four stroke cycle diesel engines; intake, scavenging and exhaust systems; injection systems, starting and reversing methods; cooling and lubricating systems; and engine room layout in modern motor vessels.

**403. Marine Steam and Gas Turbines. (2-2). Credit 3. I**

Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; construction of marine steam turbines and their operating principles as applied to main propulsion and auxiliary use aboard ship.

**404. Maritime Regulatory Law. (3-0). Credit 3. II**

A study of marine engineering standards, specifications, and requirements prescribed by the Bureau of Marine Inspection, U. S. Coast Guard; the American Bureau of Shipping; and the Bureau of Ships, U. S. Navy.

**405. Steam Generators. (2-2). Credit 3. I**

Characteristics, historical development, and classification of marine boilers. Construction specifications of the U. S. Coast Guard Marine Engineering Regulations. Principles of combustion and boiler head balance when using fuel oil. Water conditioning and procedures in operation and maintenance.

**406. Engineering Repairs. (1-3). Credit 2. II**

Basic foundations in the theory and practical applications of machinery repair equipment commonly found aboard ship. Practice in oxy-acetylene welding, brazing, cutting and electric arc welding; pipe welding, tube sweating; valve and pump maintenance; emergency repairs.

**408. Nuclear Propulsion II. (2-2). Credit 3. II**

A study of reactor controls and instrumentation including basic electronics, design, installation, and maintenance of various types of control systems. A survey of nuclear propulsion and the marine industry is made. Advantage is taken of the shipyard nuclear facilities in the Galveston area for practical field trips.

**409. Naval Architecture III. (2-0). Credit 2. I**

The resistance and powering of ships; principles of model testing and similitude for ship's hulls and propellers, and propulsive efficiency. Fundamentals of propeller design, blade strength and cavitation.

## Department of Marine Transportation and Nautical Science

Capt. Bennett M. Dodson, USN (Retired), Superintendent

### MARINE TRANSPORTATION

**101. Maritime Orientation. (0-2). Credit 1. I**

A survey of the maritime industry, ocean transportation, trade routes of the world, and the vital part played by the U. S. Merchant Marine in the international trade of the United States and in the defense of the nation. Steamship organization, ship organization, and general operating methods are discussed. A survey is made of the career patterns available to graduates in this field.

**301. Ocean Transportation. (3-0). Credit 3. I**

The principles and practices of marine carrier operations; organization, structure, policy, administration, and documentation. Topics include charter parties, rate conferences, bills of lading, contracts of carriage, terminal operations; tanker, cargo, and passenger ship management.

**302. Marine Cargo Operations I. (2-2). Credit 3. I**

The essential requirements and problems in the stowage and carriage of general and bulk (dry and liquid), refrigerated, and special cargoes. Theoretical and practical problems in receiving, stowing, securing, transporting, and discharging all types of cargo.

**401. Marine Insurance. (3-0). Credit 3. I**

The principles and practices of marine underwriting, loss adjusting, and general average with emphasis on the application of these principles to the policies and problems of cargo, hull, and protection and indemnity insurance. The interest of the underwriters in safety problems and accident prevention in the maritime industry is surveyed.

**403. Admiralty and Maritime Law. (3-0). Credit 3. I**

A survey of the history and the development of admiralty law; fundamental legal problems connected with shipping; federal and state jurisdiction over maritime matters, admiralty torts, and contracts. Laws governing marine inspection and safety at sea; obligations and responsibilities of ships' personnel. Labor relations and contracts between shipowners and unions are thoroughly reviewed.

**404. Ocean Traffic Management. (2-0). Credit 2. II**

The organization and administration of passenger, freight and subsidiary departments of steamship lines; conferences and rate making; chartering; booking and documentation, and ship scheduling. The elements of transportation expenses including port charges, overhead, brokerage, ship operating expenses, and insurance are related to revenue.

**406. Marine Cargo Operations II. (2-2). Credit 3. II**

Methods of handling special cargo such as gold; regulations pertinent to entry and clearance of vessels from ports in various nations. An exercise is made of loading general cargo in Galveston with a ship destined for ports in the Far East and return. Cargo is loaded and discharged in way ports. The student is required to prepare loading plans for each port taking into account considerations of draft, load line, trim, and expeditious turn around. He is to prepare manifests and other documents, and from a given set of expense factors he is to calculate the profit and/or loss for the voyage.

## NAUTICAL SCIENCE

**102. Ship Organization and Operations. (2-0). Credit 2. II**

An elementary introduction to ship organization covering such topics as station bills, routine, duties of personnel; types of ships, ship nomenclature; safety at sea and emergency drills; general preparation for the first sea training period.

**200. Basic Communications, Navigation, and Seamanship. Credit 4. S**

This course represents the practical application of the student's classroom studies aboard the training ship during the first training cruise. The student completes basic projects in communications, navigation, and seamanship.

**201. Naval Architecture I. (3-0). Credit 3. I**

Description of a ship as a self-sustaining unit; shipbuilding nomenclature and dimensions, types of construction and classification of merchant ships; classification societies; shipbuilding materials and methods, and structural components of the ship.

**202. Naval Architecture II. (2-0). Credit 2. II**

Ship's lines drawing and form calculations; principles of flotation and buoyancy; inclining experiments, free liquids, transverse stability; motion of ships in waves, seaway and dynamic loads; ship structure tests.

**203. Seamanship I. (2-3). Credit 3. I**

The art of handling small boats under oars, sail, and power. Lifeboat launching and equipment; construction and types of boats. The application of ground tackle, knotting and splicing, blocks and tackle. Communications practice; Rules of the Nautical Road.

**204. Terrestrial Navigation. (3-0). Credit 3. I**

The fundamentals of basic navigation with definitions; plane sailing, middle latitude sailing, and mercator sailing; piloting, chart projections, and chart navigation.

**300. Intermediate Communications, Navigation, and Seamanship. Credit 4. S**

This course represents the practical application of the student's classroom studies aboard the training ship; during the second training cruise. The student completes intermediate projects in communications, navigation, and seamanship.

**301. Seamanship II. (2-3). Credit 3. I**

The mechanical principles involved in the operation of ship's cargo gear; the operational limitations and safety factors of such heavy lifts as locomotives and power plant generators. Marine inspection regulations pertaining to passenger vessels and tankers. Additional communications including use of the International Signal Book (H.O. No. 87).

**302. Seamanship III. (1-3). Credit 2. II**

Qualifying tests in communications. A thorough study is made of the U. S. Public Health requirements in first aid and ship sanitation. Marine inspection rules for safety at sea are stressed.

**303. Celestial Navigation. (2-3). Credit 3. I**

A survey of nautical astronomy and the use of time in the nautical almanac; use of the sextant; problems in celestial navigation including calculations of time of sunset, sunrise, sun's transit, and determination of compass error by azimuth and amplitude; lines of position; observations by use of stars, planets, and the moon; solution of the spherical triangle by a number of methods and tables.

**304. Electronic Navigation. (2-2). Credit 3. II**

A study of the theory, methods, and application of determining position by means of electronic aids including radar, direction finder, and Loran. The student is examined by the U. S. Coast Guard for certification as Radar Observer.

**400. Advanced Communications, Navigation, and Seamanship. Credit 4. S**

This course represents the practical application of the student's classroom studies aboard the training ship during the third training cruise. The student completes advanced projects in communications, navigation, and seamanship.

**401. Seamanship IV. (2-3). Credit 3. II**

Principles and methods of propulsion and steering of ships. Ship handling in heavy seas, docking, undocking, anchoring, mooring, towing, salvage, and ice seamanship. Damage control is stressed. Qualification examinations are held in seamanship and communications.

**404. The Navigator. (2-3). Credit 3. II**

Exercises in the day's work of the navigator at sea. Planning routes of voyages. A study is made of the buoyage systems used throughout the world and a survey is made of various sailing guides and port directories. Gyroscope compass fundamentals and magnetic compass compensation are covered.

## Department of Mathematics

Professor E. C. Klipple,
Professors R. E. Basye, B. W. Brewer, J. T. Hurt, E. R. Keown, H. A. Luther; Associate Professors Dan Hall, J. T. Kent, W. S. McCulley, R. V. McGee, B. C. Moore, S. A. Sims, M. E. Tittle; Assistant Professors K. R. Bailey, O. L. Baugh*, J. R. Hillman, F. N. Huggins, R. R. Lyle, N. W. Naugle, H. D. Perry; Instructors E. P. Armendariz, D. D. Davis, G. E. Fridel, J. E. Harris, L. M. Hovorak, R. A. Knapp, C. B. Moehlman, M. L. Williams

**101. Algebra. (3-0). Credit 3. I, II, S**

A review of the fundamentals of mathematics, graphs, systems of linear equations, exponents and radicals, quadratic equations, binomial theorem.

**102. Algebra. (3-0). Credit 3. I, II, S**

Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

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*Deceased 10-31-62.

**103. Plane Trigonometry. (3-0). Credit 3. I, II, S**

Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, inverse trigonometric functions, trigonometric equations.

**104. Analytic Geometry. (3-0). Credit 3. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, transformation of coordinates, polar coordinates, parametric equations, plane, quadric surfaces. Prerequisite: Mathematics 103.

**106. Spherical Trigonometry. (3-0). Credit 3. II**

Geometry of the sphere; solution of spherical triangles; application of spherical trigonometry to terrestrial and celestial spheres. A brief survey of the solar system is included. Prerequisite: Mathematics 103.

**110. Survey Course in Mathematics. (3-0). Credit 3. I, II, S**

Functions and graphs, derivatives of polynomials, integrals of polynomials, systems of equations, logarithms, progressions, binomial theorem, compound interest and annuities, permutations and combinations, probability. Prerequisite: Mathematics 102.

**116. Plane Trigonometry and Analytic Geometry. (4-0). Credit 4. I, II**

Trigonometric functions, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, functions and graphs; the straight line, circle, parabola, ellipse, hyperbola, polar coordinates, sketching of surfaces. Prerequisite: Mathematics 102. (For students registered in architecture.)

**121. Analytic Geometry and Calculus. (4-0). Credit 4. I, II, S**

Equation of a locus, locus of an equation, lines, circles, other conic sections, functions, limits, derivatives of polynomials and other algebraic functions, applications of differentiation, integration of polynomials, areas and volumes by integration. Prerequisites: Mathematics 102 and 103, or satisfactory performance on a qualifying examination.

**122. Calculus. (4-0). Credit 4. I, II, S**

Derivatives of transcendental functions; comprehensive study of integration; application of integration to moments, arc lengths, areas of surfaces of revolution, liquid pressure, and work; improper integrals; indeterminate forms. Prerequisite: Mathematics 121 or 209.

**209. Calculus. (3-0). Credit 3. I, II, S**

Variables, functions, and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Mathematics 104.

**210. Calculus. (3-0). Credit 3. I, II, S**

Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Mathematics 209.

**215. Finite Mathematics. (3-0). Credit 3. I, II**

Logic, theory of sets, Venn diagrams, partitions and counting, vectors and matrices, linear programming, theory of games, applications to behavioral science problems. Prerequisite: Mathematics 110.

**223. Differential and Integral Calculus. (4-0). Credit 4. I, II**

Limits, rate of change, the derivative, maxima and minima, differentiation of polynomials; the definite integral; volume, differentiation of implicit functions, special devices for integration, center of gravity, moment of inertia, double integrals. Prerequisite: Mathematics 116. (For students registered in architecture.)

**303. Theory of Equations. (3-0). Credit 3. I, II**
Complex numbers, remainder theorem, factor theorem, synthetic division, nature of roots of equation, ruler and compass construction, solution of cubic and quadric equations, isolation of a root, solution of numerical equations, determinants, matrices, systems of linear equations, symmetric functions, elimination, resultants, discriminants. Prerequisite: Mathematics 122 or 210.

**307. Calculus. (3-0). Credit 3. I, II, S** †
Introduction to series. Taylor's series, partial differentiation multiple integrals, applications. Prerequisite: Mathematics 122 or 210.

**308. Differential Equations. (3-0). Credit 3. I, II, S** †
Elementary and linear equations with applications, solution by Laplace transforms and by series, Fourier series, applications. Prerequisite: Mathematics 307.

**315. Introduction to Modern Algebra. (3-0). Credit 3. I, II, S**
Number theory and proof, integral domains, definitions and postulates, Euclidean algorithm, equivalence and congruence, Boolean algebra, groups, isomorphisms, rings and fields, matrices. Prerequisite: Mathematics 122 or 210 or 215.

**405. Vector Analysis. (3-0). Credit 3. I, II** †
Elementary operations, vector and scalar products of two vectors, vector and scalar products of three vectors, differentiation of vectors, the differential operators, applications to electrical theory, dynamics, mechanics, and hydrodynamics. Prerequisite: Mathematics 307.

**409. Advanced Calculus. (3-0). Credit 3. I, II, S** †
The concept of a function, limit of a sequence, continuity, theorems on continuous functions, the definite integral, the derivative, mean value theorems, hyperbolic functions, improper integrals. Prerequisite: Mathematics 307.

**410. Advanced Calculus. (3-0). Credit 3. II** †
Theory of plane curves, mechanics of a particle, Taylor's theorem and applications, numerical integration, convergence and divergence of series, power series, periodic functions, Fourier series. Prerequisite: Mathematics 409.

**411. Mathematical Probability. (3-0). Credit 3. I, II** †
Introductory concepts, permutations and combinations, elementary principles of the theory of probability, probability of experiment, distribution functions and continuous variables, averages, curve fitting, applications. Prerequisite: Mathematics 307.

**414. Mathematical Statistics. (3-0). Credit 3. I, II, S** †
History and terminology of statistics, probability theory, discrete and continuous distributions, expected values, moments, sampling, confidence intervals, tests of hypotheses. Prerequisite: Mathematics 307.

**415. Modern Algebra. (3-0). Credit 3. I, S** †
Integers, rational numbers, real numbers, complex numbers. Groups, rings, integral domains, fields. Polynomials over a field. Prerequisite: Mathematics 307.

**416. Modern Algebra. (3-0). Credit 3. II** †
Fundamental ideas in modern algebra centered around the basic concept of a group; the group concept; complexes and subgroups; groups of permutations; abelian groups. Prerequisite: Mathematics 415.

**417. Numerical Analysis. (3-3). Credit 4. I, II, S** †

Difference tables and applications, interpolation, numerical integration and differentiation, selected topics in Taylor's Series, orthogonal polynomials, error analysis, numerical solution of equations, elementary matrix theory, numerical solution of differential equations. The laboratory will consist of programming relevant problems on medium and high speed computers, and the operating of a medium speed computer. Prerequisite: Mathematics 308 or registration therein.

## FOR GRADUATES

**600. Fundamental Mathematics in Secondary Schools. (3-0). Credit 3. S**

Basic concepts of arithmetic, algebra, geometry, and trigonometry as viewed from the standpoint of higher analysis; famous problems; construction of tables and slide rules; other topics designed to help vitalize the teaching of high school mathematics. Prerequisite: Mathematics 122 or 210.

**601. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Surface integrals, line integrals, vector analysis, partial differential equations, elementary complex variables, applications. Prerequisite: Mathematics 308.

**602. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Fourier integrals, Bessel and Legendre functions, Laplace's equation, the diffusion equation, the wave equation, Green's functions. Prerequisite: Mathematics 601.

**606. Theory of Probability. (4-0). Credit 4. II**

Formulae for combinations and arrangements, problems in total and compound probability, expectation, risk, the problem of repeated trials, Stirling's formula, probability integral, theorems in mean value, dispersion, determination of best value, the law of error, the correlation coefficient, curve fitting. Prerequisite: Mathematics 411.

**607. Real Variables. (4-0). Credit 4. I**

Fundamental theory of number sets and point sets, elementary applications to real functions, theory of linear measure. Prerequisite: Mathematics 409.

**608. Real Variables. (4-0). Credit 4. II**

Measurable functions, the Riemann integral, the Lebesgue integral, applications to real functions and series. Prerequisite: Mathematics 607.

**609. Numerical Analysis. (3-3). Credit 4. I**

Linear programming, matrix calculations, Monte Carlo methods, theory of games. The laboratory will consist of programming the solution of appropriate problems on a high speed digital computer. Prerequisite: Mathematics 417.

**610. Nnmerical Methods in Differential Equations. (3-3). Credit 4. II**

Elementary numerical solutions, analytical foundations, systems of equations, higher order equations, two-point boundary problems, numerical methods for partial differential equations. The laboratory will consist of programming a high speed digital computer. Prerequisite: Mathematics 417.

**611. Ordinary Differential Equations. (4-0). Credit 4. I**

Definitions, general methods of solving first order differential equations, singular solutions, geometrical applications, trajectories, motions of a particle, special methods for the equation of the first order, linear equations of the second order, the method of successive approximations, systems of ordinary differential equations, interpolation and numerical integration, symbolic methods, numerical solution of differential equations. Prerequisite: Mathematics 308.

**612. Partial Differential Equations. (4-0). Credit 4. II**
General solution of first order partial differential equations, solution of second order equations from physics and mechanics by separation of variables, solution of second order equations by Green's functions. Prerequisite: Mathematics 611 or the equivalent.

**615. Vector Spaces and Matrices. (4-0). Credit 4. I**
Development of the fundamental properties of matrices by use of vector spaces and linear transformations. Prerequisite: Mathematics 409 or 415.

**616. Linear Transformations and Matrices. (4-0). Credit 4. II**
Development of canonical forms for matrices by use of transformations. Prerequisite: Mathematics 615.

**617. Complex Variables. (4-0). Credit 4. I, S**
Fundamental theory of analytic functions, conformal mapping, applications. Prerequisite: Mathematics 601.

**618. Complex Variables. (4-0). Credit 4. II**
The Schwartz-Christoffel theorem, infinite products, meromorphic functions, elliptic functions, special functions, applications. Prerequisite: Mathematics 617.

**620. Fourier Series and Allied Topics. (4-0). Credit 4. I**
Convergence of Fourier series, the cosine series, the sine series, uniform convergence of Fourier series, differentiation and integration of Fourier series, Fourier integrals, Bessel functions. Prerequisite: Mathematics 608.

**622. Laplace Transforms. (4-0). Credit 4. II, S**
Fundamental theorems concerning Laplace transforms. Applications to ordinary and partial differential equations, difference equations, and integral equations. Prerequisite: Mathematics 601.

**623. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. II**
Derivation and solution of the differential equations of chemistry and chemical engineering, mathematical theory of distillation, series solutions of differential equations, Bessel functions. Prerequisite: Mathematics 308.

**624. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. I**
Equations of finite differences, applications of partial differentiation, solution of partial differential equations, Fourier integrals, orthogonal systems, numerical and graphic methods, theory of errors. Prerequisite: Mathematics 623.

**625. Matrix Algebra and Tensor Calculus. (4-0). Credit 4. I, II, S**
Elementary matrix operations; linear transformations; canonical and modified triangular forms of matrices; inverse of a non-singular matrix; diagonal and rotation matrices; characteristic roots of a matrix; symmetric matrices; tensor concept; covariance and contravariance; algebra of tensors; metric tensors; Christoffel's symbols; covariant differentiation of tensors; applications. Prerequisite: Mathematics 405 or 601.

**627. Theory of Numbers. (3-0). Credit 3. I**
Ordered rings; the ring of integers; Euclidean rings; unique factorization; congruencies; the Fermat-Euler Theorem; residues of powers; quadratic residues; the Legendre, Jacobi, and Kronecker symbols; quadratic reciprocity; diophantine equations; the series of primes; tests for primality. Prerequisite: Mathematics 409 or 415.

**628. Theory of Numbers. (3-0). Credit 3. II**
Commutative rings; ideals and residue class rings; principal ideal rings; unique factorization rings; quadratic fields; fields of higher degree. Prerequisite: Mathematics 627.

**633. Group Representations. (4-0). Credit 4. I**

This course introduces the basic properties of groups necessary for the study of group representations. Based on this foundation, the remainder of the course develops the theory of the representation of finite groups. The course content will be somewhat determined by the interest and preparation of the students. Prerequisites: Mathematics 415; approval of the instructor.

**636. Topology. (3-0). Credit 3. II**

Axiomatic treatment of topological spaces. The metrization problem. Applications to arcs and curves. Prerequisite: Mathematics 607.

**641, 642. Modern Analysis. (4-0). Credit 4 each semester. I, II**

Recent developments in the theory of functions. Prerequisite: Mathematics 608.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable students to undertake and complete with credit limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Mathematics 601.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Mechanical Engineering

Professor C. M. Simmang,

Professors C. W. Crawford, E. S. Holdredge, L. S. O'Bannon, J. G. H. Thompson, W. I. Truettner, R. M. Wingren; Associate Professors J. H. Caddess, D. W. Fleming, R. H. Fletcher, A. M. Gaddis, R. H. Gibbs*, W. S. Guthrie; Assistant Professors A. B. Alter, Earl Logan, Jr., J. M. Nash, T. A. Noyes, J. V. Perry, Jr., P. D. Weiner; Instructors P. M. Beckham, S. E. Brown, A. J. Edmondson, R. H. Gibson, E. D. Kranz, H. G. Stallings

**101. Engineering Problems. (0-3). Credit 1. I, II**

An introduction to elementary mechanics to include forces and force systems units and dimensional equations, the free body concept, motion and the application of Newton's laws of motion. A course designed especially for beginning students in architecture, industrial education, and food technology with the objective of developing analytical reasoning and the logical organization of data. Prerequisites: Mathematics 102, and 103 or 116, or registration therein.

**105. Carpentry and Mill Work. (1-6). Credit 3. I, II**

This course is designed for freshman architectural students and for business administration freshmen taking building products marketing. The course includes simple building construction such as framing, roof construction, general carpentry work, exterior and interior finishing, forms, working drawings, and mill work including the use of machines, hand tools, safety, and built-in cabinet construction in the home.

**106. Cabinet Making. (1-6). Credit 3. II**

Design, rod making, construction, and finishing of furniture; glues, varnishes, lacquers, and other finishing materials; production methods; care and maintenance of woodworking machinery.

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*On leave of absence from 9-1-62 to 1-31-63.

**201. Manufacturing Processes. (0-3). Credit 1. I, II**
Simple pattern layouts and construction of patterns; pattern storage; costs and weights of patterns and castings; kiln-drying and moisture content of pattern woods; the patternmaking industry. Cupolas; gas-fired furnaces, moulding sands; core-making; foundry layouts; and practice in moulding and casting both ferrous and non-ferrous metals. Welding materials and equipment, demonstration and practice in Heliarc, Atomic-hydrogen, metallic arc, electrical resistance, oxy-acetylene, and metallizing. Prerequisite: Engineering Graphics 105.

**202. Manufacturing Processes. (0-3). Credit 1. I, II**
A continuation of Mechanical Engineering 201, including advanced methods of patternmaking, moulding, and weld inspection and testing, fundamentals of joint design and metallography. Prerequisite: Mechanical Engineering 201.

**212. Engineering Mechanics. (3-0). Credit 3. I, II, S**
Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity, and moment of inertia. Prerequisites: Mathematics 122 or 210 or registration therein; Physics 218.

**220. Engineering Mechanics. (4-0). Credit 4. I**
The principles of mechanics as related to both statics and kinetics. A condensation of the material in Mechanical Engineering 212 and 313. Prerequisites: Mathematics 122 or 210 or registration therein; Physics 218.

**309. Machine Production Techniques. (0-3). Credit 1. I, II, S**
Lecture demonstrations and practice in safety, care of machines and hand tools, shop organization, cutting speeds and feeds, standard machine tool work in metals, single point tool grinding, layout, drilling, tapping, shaping, turning, boring, threading, and milling. Prerequisite: Engineering Graphics 105.

**310. Machine Production Techniques. (0-3) . Credit 1. I, II, S**
A continuation of Mechanical Engineering 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures, and fixed gages. Prerequisite: Mechanical Engineering 309.

**313. Engineering Mechanics. (3-0). Credit 3. I, II, S**
A continuation of Mechanical Engineering 212, including kinematics, both graphical and algebraic solutions of relative linear velocities and accelerations, kinetics, dynamics of translation and rotation, work, energy, impact, momentum, and balancing. Prerequisite: Mechanical Engineering 212.

**323. Thermodynamics. (4-0). Credit 4. I, II**
The thermodynamics of ideal gases, including non-flow and steady-flow processes; internal combustion engines; gas compressors; combustion; vapors and vapor mixtures, boilers, and vapor cycles. Prerequisites: Mathematics 122 or 210; Physics 219.

**327. Thermodynamics. (3-0). Credit 3. I, II, S**
The thermodynamics of gases, vapors, and liquids in various non-flow and steady-flow processes; internal combustion engines; gas compressors; power plant equipment; closed and open systems of various types. Prerequisites: Mathematics 122 or 210; Physics 219.

**328. Thermodynamics. (3-0). Credit 3. I, II, S**
A continuation of Mechanical Engineering 327, covering gas mixtures, variable specific heats, turbines, modern power plant cycles, combustion, refrigeration, air conditioning, heat transfer. Prerequisite: Mechanical Engineering 323 or 327.

**329. Advanced Cabinet Making. (1-6). Credit 3. II**

Cabinet and furniture design, estimating, detailing, rod making construction and finishing. A major project is to be constructed from a set of drawings and details made by the student. A term paper is required on some related subject, such as design, finishing, safety, production methods, etc. Prerequisite: Mechanical Engineering 105 or 106, or equivalent experience.

**337. Kinematic Drawing. (0-3). Credit 1. I**

Problems and drafting involving linkages, centros, relative linear velocities, cams and gears. Designed especially to supplement the kinematics of motion included in the course of dynamics. Prerequisite: Mechanical Engineering 313 or registration therein.

**338. Kinematics and Machine Design. (2-3). Credit 3. I, II, S**

The first part (kinematics) is designed to accompany or follow the course in dynamics and to include analytical, graphical, and design applications of certain topics from dynamics. The second part (machine design) is designed to effect the transition from strength of materials to stress analysis and design of load bearing machine parts. Prerequisites: Civil Engineering 305 and Mechanical Engineering 313 or registration therein.

**340. Physical Metallurgy. (2-3). Credit 3. I, II, S** †

The fundamentals of the physical metallurgy of irons, steels, and their alloys; precipitation hardening and corrosion resistance of non-ferrous alloys; laboratory work in polishing, etching, and preparation of specimens, making and studying photomicrographs. Prerequisite: Civil Engineering 305, or registration therein.

**344. Fluid Mechanics. (3-0). Credit 3. I, II, S**

Application of the laws of statics, buoyancy, stability, energy, and momentum to the behavior of ideal and real fluids. A study of dimensional analysis and similitude and their application to flow through ducts and piping, dynamic lift and related problems. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**346. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. I, II**

The application of mechanics and thermodynamics to the behavior of ideal and real fluids. A study of the fundamental laws relating to heat flow. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**403. Engineering Laboratory. (1-3). Credit 2. I, II, S**

Study and calibration of instruments used in laboratory work and simple tests of engines, pumps, and flow devices. Engineering analysis and analogue theory are stressed. Calculations and written reports on the investigations and results obtained. Prerequisites: Mechanical Engineering 323 or 327 and registration in Mechanical Engineering 344 or Chemical Engineering 304.

**404. Engineering Laboratory. (1-3). Credit 2. I, II, S**

A continuation of Mechanical Engineering 403 with more advanced work in the analysis of steam and internal combustion engines, turbines, fans, refrigeration machinery, pumps, and various flow devices. Prerequisites: Electrical Engineering 331; Mechanical Engineering 328, 344, 403.

**409. Structure and Properties of Alloys. (2-3). Credit 3. I**

This course gives a description of the fundamental properties of alloys. These alloys are the base on which most of present-day technology rests. Prerequisites: Chemistry 102 or 104; Mechanical Engineering 340; Physics 220.

**410. Internal Combustion Engines. (3-0). Credit 3. I, II** †

Thermodynamics of cycles for internal combustion engines and gas turbines, including fuels and combustion. Performance characteristics of various types of engines. Prerequisite: Mechanical Engineering 323 or 327.

**414. Steam and Gas Turbines. (3-0). Credit 3. I** †

Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; study of steam turbines and of special cycles. Prerequisites: Mechanical Engineering 328, 344.

**417. Power Engineering. (3-0). Credit 3. I, II, S**

The application, operation, and performance of all types of power plant equipment. The selection and arrangement of such equipment from the standpoint of economics. Prerequisites: Mechanical Engineering 328, 461.

**420. Marine Engineering. (3-0). Credit 3. I**

Applications of power engineering to ship propulsion and to auxiliary machinery in merchant ships, including steering engines, electric generators, fresh water distillers, refrigeration plants, and devices for safe navigation. Elementary naval architecture, stability of ships under effects of weather, damage control, general aspects of nuclear propulsion plants and small boat engines are considered. Prerequisite: Mechanical Engineering 344 or 346.

**432. Automotive Engineering. (3-0). Credit 3. II**

The modern automobile, its power plant, fuels, performance, vibration, dynamic balancing, electrical equipment, braking systems, construction, etc., from an engineering standpoint. Prerequisites: Mechanical Engineering 313, and 323 or 327.

**436. Air Conditioning and Refrigeration. (3-0). Credit 3. II** †

Application of the principles of thermodynamics to equipment and methods of practical production of refrigeration. The thermodynamics of conditioning air. Selection of equipment, piping, and duct layouts for heating, ventilating, and air conditioning. Prerequisite: Mechanical Engineering 323 for non-mechanical engineering majors; 328 for mechanical engineering majors.

**445. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design, applied to various machine parts, such as columns, screws, shafts (considering combined stresses), bearings, brakes, springs, and complete machines. Prerequisites: Mechanical Engineering 310, 338, 340.

**446. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to problems encountered in transmission of power by means of belts, chains, and gears. Prerequisite: Mechanical Engineering 445 or registration therein.

**457. Engineering Analysis. (3-0). Credit 3. II** †

Mathematical and experimental methods of solving problems in the various fields of engineering. Dimensional analysis, representation and analysis of experimental data, graphical and numerical solution of differential equations, analogies and computers. Prerequisites: Mathematics 308; senior classification in engineering.

**459. Mechanical Vibration. (3-0). Credit 3. I, II, S** †

The basic theory of vibrating systems with single and multiple degrees of freedom and the principles of transmission and isolation of vibrations. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**461. Heat Transfer. (3-0). Credit 3. I, II, S** †

Study of conduction, convection, and radiation separately and in combination; steady and unsteady states; mathematical treatments; graphical and numerical solutions, dimensional analysis. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**481. Seminar. (0-2). Credit 1. I, II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of engineering and manufacturing processes. Lectures from industrial representatives. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

A continuation of Mechanical Engineering 481 but with more extensive reports and with lectures from visitors. Prerequisite: Senior classification.

**485. Advanced Problems in Mechanical Engineering. Credit 2 to 5. I, II, S** †

Special problems in the various phases of mechanical engineering are assigned to individual students or to groups. Readings are assigned, and frequent consultations are held. Prerequisites: By permission and senior classification in mechanical engineering.

**599. Mechanics for College Teachers: Statics. (4-0). Credit 4. S**

Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity, moment of inertia, graphical methods, teaching techniques in both analytical and vector methods; associated seminar. Prerequisites: Graduate classification; approval of the Heads of the Education and Mechanical Engineering Departments.

## FOR GRADUATES

**600. Mechanics for College Teachers: Dynamics. (3-0). Credit 3. S**

Kinematics of absolute and relative displacement, velocity, and acceleration by graphical, algebraic, and vector methods to include Coriolis' component; kinetics and dynamics of translation and rotation, work, energy, impact, momentum, balancing; teaching techniques, associated seminar. Prerequisites: Mathematics 685 (2 hours); Mechanical Engineering 599.

**601. Advanced Machine Design. (4-0). Credit 4. I**

A study of special design problems in mechanical engineering such as design of piping systems subjected to thermal expansion, theory of lubrication, curved beams and flat plates. Prerequisites: Mathematics 308; Mechanical Engineering 445 or the equivalent.

**603. Power Plants. (2-6). Credit 4. II**

The design of central and isolated power plants with special attention to over-all economic operation. Prerequisite: Mechanical Engineering 417.

**605. Engineering Analysis. (4-0). Credit 4. I, S**

A study of analytical, graphical, and approximate methods of solving problems common to engineering; dimensional analysis and model study; design of experiments; statistical analysis and interpretation of test data including derivation of empirical equations. Prerequisite: Mathematics 308.

**613. Engineering Dynamics. (4-0). Credit 4. II**

A study of the dynamics of particles and of rigid bodies; the virtual work principle, Lagrange's and Euler's equations of motion, and Hamilton's principle applied to engineering problems. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**615. Advanced Engineering Thermodynamics. (4-0). Credit 4. I**

The theories of thermodynamics and their application to the more involved problems in engineering practice. Prerequisite: Mechanical Engineering 328.

**616. Heat Transmission. (4-0). Credit 4. II**

The fundamental laws relating to heat flow, the application of these laws to engineering materials used in various industrial processes; a study of recent developments by reference to current literature. Prerequisites: Mathematics 601; Mechanical Engineering 605.

**617. Mechanical Vibrations. (4-0). Credit 4. I, S**

The theory of vibrations of machines and structures. Vibration of elastic bodies and of non-linear systems. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**618. Advanced Air Conditioning. (2-6). Credit 4. II**

Thermodynamics of air vapor mixtures applied to problems of air conditioning. Practice in design and selection of equipment with emphasis on the preparation of plans and specifications. Prerequisite: Mechanical Engineering 436.

**620. Experimental Stress Analysis. (3-3). Credit 4. I**

Study of photoelasticity, electric strain gauges, stresscoat, etc. Prerequisite: Mathematics 308 or registration therein.

**621. Fluid Mechanics. (4-0). Credit 4. I**

A study of flow problems encountered in the design of water, gas, and steam turbines; centrifugal and axial-flow pumps and compressors. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**631. Jet Propulsion. (4-0). Credit 4. I**

Study of the fluid mechanics and thermodynamics of turboprop engines, ramjets, turbojets, rocket motors, and electric propulsion systems. Where applicable, an analysis of the performance of these systems will be made. Prerequisites: Graduate classification in engineering; approval of the Head of the Department.

**640. Ferrous Metallurgical Design. (3-3). Credit 4. II**

A detailed study of the phase transformations in steel, the resulting changes in mechanical properties, the peculiarities of the steels, and their influence upon the design of machine elements. Prerequisite: Mechanical Engineering 340.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

The content will be adapted to the interest and needs of the group enrolled.

**691. Research. Credit 1 or more each semester. I, II, S**

Methods and practice in mechanical engineering research for thesis or dissertation.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**

See Structural Mechanics for a full description of this course.

## Department of Military Science and Tactics

Frank L. Elder, Colonel, Infantry, USA
Professor of Military Science

### UNITED STATES ARMY

Associate Professors: Lieutenant Colonels R. E. Byrnes, T. A. Hotchkiss, H. A. Stuverud, A. E. Vernon; Majors D. E. Bolte, D. J. Chandler, W. T. Gordon, F. S. Hertzog, T. O. Matchin, L. L. Stevenson; Assistant Professors: Captains W. W. Bell, H. H. Carmichael, W. T. Jessee, J. L. Lorms, W. D. Old, II, H. M. Sanders, Jr., J. R. Vilas

### Basic Course of Military Science

**121. First Year Basic Military Science. (0-2). Credit 1. I**

*Theoretical: Organization of the Army and ROTC; individual weapons and marksmanship; United States Army and national security.

Practical: Leadership, drill and command, individual weapons and marksmanship.

**122. First Year Basic Military Science. (0-2). Credit 1. II**

A continuation of Military Science 121.

**221. Second Year Basic Military Science. (0-3). Credit 1. I**

Theoretical: American military history; map and aerial photograph reading; introduction to operations and basic tactics.

Practical: Leadership, drill and command.

**222. Second Year Basic Military Science. (0-3). Credit 1. II**

A continuation of Military Science 221.

### Advanced Course of Military Science

**321. First Year Advanced Military Science. (2-2). Credit 3. I**

**Theoretical: Leadership; military teaching methods; branches of the army; small unit tactics and communication; pre-camp orientation.

Practical: Leadership, drill and command; tactics, military teaching methods.

**322. First Year Advanced Military Science. (2-2). Credit 3. II**

A continuation of Military Science 321.

**421. Second Year Advanced Military Science. (2-2). Credit 3. I**

**Theoretical: Operations; logistics; Army administration; military law; service orientation; role of the United States in world affairs.

Practical: Leadership, drill and command.

**422. Second Year Advanced Military Science. (2-2). Credit 3. II**

A continuation of Military Science 421.

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*Thirty contact hours of an acceptable academic subject will be substituted for a like number of military subject contact hours. (Normally this subject will be English 103.)

**In both the first and second year of Advanced Military Science, 45 contact hours of an acceptable academic subject are substituted for a like number of military subject contact hours. Since the academic subject substituted depends on the individual cadet's academic major, the Military Science Department will assign each subject to the cadet at the time of registration.

## Department of Modern Languages

Professor J. J. Woolket,
Professor J. A. Dabbs; Associate Professor E. C. Breitenkamp, J. M. Skrivanek;
Instructors J. D. Deliz, C. E. Evans, M. E. Gottschalk, M. C. Quinn, E. S. Wells

Foreign languages, in addition to their unquestioned cultural value, have a utilitarian value of great importance for those expecting to engage in research or purely practical pursuits. It is, therefore, advisable, when possible, for students to take up such a language during their undergraduate studies and thereby have the use of it when they begin advanced work in agriculture, engineering, or in pure science. Otherwise, as often happens, their specialization may be hampered or delayed. A language laboratory is available for those interested in developing a command of the spoken language.

**100. Spoken English for Foreign Students. (3-0). Credit 3. I, II, S**
Instruction in American-English pronunciation; intensive class drill; individual laboratory work in comprehension and practice in correct pronunciation by means of tape recordings; study of idiomatic and colloquial expressions; orientation in the American way of life and in university procedure.

**101. Beginning French. (3-0). Credit 3. I**
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at midsemester; early attention given to background for conversation. A certain amount of class preparation will be done in the language laboratory.

**102. Beginning French. (3-0). Credit 3. II**
Continuation of Modern Language 101 with completion of study elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. A certain amount of class preparation will be done in the language laboratory. Prerequisite: Modern Language 101 or equivalent.

**103. Beginning German. (3-0). Credit 3. I, II, S**
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation. A certain amount of class preparation will be done in the language laboratory.

**104. Beginning German. (3-0). Credit 3. I, II, S**
Continuation of Modern Language 103 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. A certain amount of class preparation will be done in the language laboratory. Prerequisite: Modern Language 103 or equivalent.

**105. Beginning Spanish. (3-0). Credit 3. I, II, S**
For students who have had no previous training in Spanish. Study of standard elementary grammar with oral and reading exercises; early attention given to background for conversation. One half of class preparation will be done in language laboratory. On completion of course the student should have a 500-word active vocabulary; he should be capable of simple conversation.

**106. Beginning Spanish. (3-0). Credit 3. I, II, S**
Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course the student should have an active vocabulary of 900 words and passive vocabulary of about 1300. Part of the class preparations will be done in language laboratory. Prerequisite: Modern Language 105 or equivalent.

**109. Beginning Russian. (3-0). Credit 3. I**

Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. A certain amount of class preparation will be done in the language laboratory.

**110. Beginning Russian. (3-0). Credit 3. II**

Continuation of Modern Language 109; continued study of elements of grammar; oral exercises designed to develop conversational ability. A certain amount of class preparation will be done in the language laboratory. Prerequisite: Modern Language 109 or equivalent.

**201. Intermediate French. (3-0). Credit 3. I**

Introduction to French readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 102 or equivalent.

**202. Intermediate French. (3-0). Credit 3. II**

Continuation of Modern Language 201 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 201 or equivalent.

**203. Intermediate German. (3-0). Credit 3. I, II**

Introduction to German readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 104 or equivalent.

**204. Intermediate German. (3-0). Credit 3. II**

Continuation of Modern Language 203 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 203 or equivalent.

**205. Intermediate Spanish. (3-0). Credit 3. I, II**

Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Language laboratory available for collateral training. Prerequisite: Modern Language 106 or two years of high school Spanish.

**206. Intermediate Spanish. (3-0). Credit 3. I, II**

Continuation of Modern Language 205. Reading of standard literary works on the 2,000-word level. Extensive written and oral work, translation and original, aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text. Prerequisite: Modern Language 205 or equivalent.

**209. Intermediate Russian. (3-0). Credit 3. I**

Review of grammar; selected readings based on everyday subjects; supplementary material to develop self-expression and recognition ability. Prerequisite: Modern Language 110 or two admission units in Russian.

**210. Intermediate Russian. (3-0). Credit 3. II**

Continuation of Modern Language 209. Readings are taken from such works as Lermontov's great novel **Hero of Our Time,** Pushkin's **Stationmaster,** and short stories from Turgenev's well known **A Sportsman's Sketches.** Prerequisite: Modern Language 209 or equivalent.

**303. Classical German Literature. (3-0). Credit 3. I**
A study of the classical period of German literature. Reading and analysis of selected works of Lessing, Schiller, and Goethe. Reports and term papers on collateral reading. Prerequisite: Modern Language 204 or approval of the Head of the Department.

**304. Twentieth Century German Literature. (3-0). Credit 3. II**
A study of twentieth-century German literature. Reading and analysis of selected works by representative naturalistic, impressionistic, and expressionistic writers. Reports and term papers on collateral reading. Prerequisite: Modern Language 204 or approval of the Head of the Department.

**305. Modern Spanish-American Drama. (3-0). Credit 3. I**
A study of representative plays by such Spanish-American dramatists as Florencio Sanchez, Martinez Cuitiño, Bustillo Oro, Rodolfo Usigli, and others. (The dramatists studied will vary depending on their contribution to the Spanish-American theater.) An effort is made to obtain an understanding of the economic, social, and cultural background of the Spanish American republics. The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. A part of the class preparation will be done in the laboratory. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1963-64 and in alternate years thereafter.)

**306. Modern Spanish-American Drama. (3-0). Credit 3. II**
Continuation of Modern Language 305. However, the authors and plays studied will differ from those offered in Modern Language 305. A part of the class preparation will be done in the laboratory. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1963-64 and in alternate years thereafter.)

**309. Advanced Russian. (3-0). Credit 3. I**
Readings of selections from Russian literature and technical and scientific publications. Special attention to participial constructions and translation of complex sentences. Conversation practice. Laboratory available for oral preparation, comprehension drill, and vocabulary-building exercises. Prerequisite: Modern Language 210 or approval of the Head of the Department.

**310. Advanced Russian. (3-0). Credit 3. II**
Continuation of Modern Language 309. Class reading of wide variety of selections from current literary, journalistic, and scientific periodicals. Partly conducted in Russian. Outside reading in selected fields of individual interest. Laboratory available for advanced conversation and comprehension drill. Prerequisite: Modern Language 309 or approval of the Head of the Department.

**325. Public Speaking in Spanish. (1-2). Credit 2. I**
Training in the preparation and delivery of talks in Spanish. Students are required to prepare and deliver a three-minute talk in Spanish once a week, and to conduct a question-answer period of three minutes on their talk. These talks are based on subjects dealing with the student's professional field and on those dealing with Spanish America. The talks are recorded for remedial work in the laboratory. Prerequisite: Completion of any 300 course in Spanish, or approval of the Head of the Department.

**326. Public Speaking in Spanish. (1-2). Credit 2. II**
Continuation of Modern Language 325 with round-table discussions and impromptu speeches. Prerequisite: Completion of any 300 course in Spanish, or approval of the Head of the Department.

**335. Spanish-American Novel. (3-0). Credit 3. I**
A study of the most important works of some distinguished contemporary Spanish-American novelists. (The list will vary but will be chosen from such writers as Güiraldes, Azuela, Gallegos, Lopez y Fuentes, Guzman, Pietri, etc.) The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. A part of the class preparation will be done in the laboratory. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**336. Spanish-American Novel. (3-0). Credit 3. II**

Continuation of Modern Language 335. However, the authors and novels studied will differ from those offered in Modern Language 335. A part of the class preparation will be done in the laboratory. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**385. Readings in French. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of French; junior classification; approval of the Head of the Department.

**401. Introduction to Scientific French. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**402. Readings in Scientific French. (3-0). Credit 3. S**

Continuation of Modern Language 401. Reading and translation of selected material in French relating to technology and the various sciences. This course is designed to develop a technical vocabulary and a facility in reading scientific French, which will help to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 401 or approval of the Head of the Department.

**403. Introduction to Scientific German. (3-0). Credit 3. I, S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**404. Readings in Scientific German. (3-0). Credit 3. II, S**

Continuation of Modern Language 403. Reading and translation of selected material in German relating to technology and the various sciences. This course is designed to develop a technical vocabulary and a facility in reading scientific German, which will help to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 403 or approval of the Head of the Department.

## Department of Naval Science

Capt. Bennett M. Dodson, USN (Retired), Superintendent

The Naval Science Department administers prescribed naval subjects within academic standards set by the Chief of Naval Personnel. Areas of instruction which are duplicated by the Academy are not taught by the Naval Science Department. Each cadet who completes the Naval Science courses and is otherwise qualified becomes eligible for, and may be granted, an inactive commission as Ensign, U. S. Naval Reserve, upon graduation.

The objectives of the Naval Science Department are:

(1) to provide the cadet with a well-rounded course in basic naval subjects;

(2) to develop an understanding of naval service and knowledge of naval practice;

(3) to develop, by precept and example, the psychology and technique of leadership.

**109. Orientation and Sea Power. (0-2). Credit 1. I**

A study of naval organization, customs, traditions, standard shipboard organization, types and characteristics of naval vessels, and elements of the various types of naval warfare.

**110. Orientation and Sea Power. (0-2). Credit 1. II**

A continuation of 109.

**209. Sea Power. (3-0). Credit 3. I**

A course to stimulate an interest in naval history and an appreciation of the contribution of sea power to the past, present, and future progress of the United States, stressing the influence of sea power on global history.

**210. Naval Weapons. (3-0). Credit 3. II**

An introduction to naval weapons to familiarize the cadet with the nomenclature and types of weapons in use today. The course includes explosives, armor, guns and gun mounts, power drives, basic principles of rockets and guided missiles, the fire control problem and associated equipment, relation of radar and CIC equipment to gunnery, anti-submarine warfare, and introduction to space technology and nuclear warfare.

**309. Naval Machinery. (3-0). Credit 3. I**

A course offered to deck cadets to afford a basic understanding of ship stability, naval engineering including main propulsion plants (steam, nuclear, and internal combustion) with emphasis being placed upon the fundamental principles. It also familiarizes the cadet with the entire shipboard engineering plant, including electrical systems, refrigeration, distillation and miscellaneous equipment, and with administration and organizational concepts in the field of naval engineering.

**310. Naval Operations. (3-0). Credit 3. II**

To acquaint the student with those responsibilities which face him in shipboard operations such as relative motion, tactical communications and instructions, and rules of the nautical road so that he may qualify in bridge and CIC watch billets afloat with a minimum of additional training; to afford a basic understanding of fleet communications; to introduce electronic counter-measures, and to afford a basic understanding of naval operations.

**311. Navigation. (3-0). Credit 3. I**

A course offered to engineer cadets to enable the cadet to acquire an understanding of the theory and technique of terrestrial and celestial navigation.

**410. Principles of Naval Leadership. (3-0). Credit 3. II**

A course built upon the foundation of General Order No. 21 which defines naval leadership as the art of accomplishing the Navy's mission through people, based on three precepts: personal example, good management practice, and moral responsibility.

## Department of Nuclear Engineering

Professor R. G. Cochran,
Professor R. A. Axford; Assistant Professor J. D. Randall*;
Instructor N. B. Poulsen

**401. Nuclear Engineering. (3-0). Credit 3. I** †

A non-rigorous treatment of the various elements of nuclear engineering. This course is especially offered for students not electing to pursue advanced study in this field. Prerequisites: Mathematics 122 or 210; Physics 219; senior classification.

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*On leave of absence from 6-1-62 to 5-31-63.

**402. Industrial Applications of Radioisotopes. (3-0). Credit 3. II** †

The properties of radioactive nuclei and the interactions of radiation with matter are discussed. The behavior of radiation detection devices is covered. The properties of radioisotopes that lend themselves to industrial usage are presented and the individual applications are evaluated. Prerequisites: Mathematics 308; senior classification.

**409. Radiological Safety. (2-0). Credit 2. I, II, S** †

Lectures and demonstrations concerning the interactions of nuclear radiations with matter and especially with biological systems. Special emphasis will be given to the theory and practice of radiation dosimetry as applied to radiation protection. Discussion of biological and physical bases for radiation safety standards. Prerequisites: Mathematics 307; Physics 220; or approval of the instructor.

## FOR GRADUATES

**601. Nuclear Reactor Analysis. (4-0). Credit 4. I**

Nuclear transformations in fission reactors. Neutron cross-sections and resonance reactions. The neutron balance and cycle. Neutron slowing-down and diffusion. Fermi age and multigroup criticality for bare, homogeneous cores. Reflected homogeneous and heterogeneous reactors. Reactor kinetics including the inhour equation, source multiplication in sub-critical reactors and fission product poisoning. Prerequisites: Mathematics 308, 601 or registration therein.

**602. Nuclear Reactor Analysis. (4-0). Credit 4. II**

Introductory transport theory with emphasis on the limitations of diffusion and age theory. Multigroup slowing-down diffusion theory for bare and reflected cores. Thermal utilization, resonance escape, fast fission, homogenization and anisotropies in heterogeneous lattices. Temperature coefficients. Control rods. Reactor kinetics with and without temperature feedback. Perturbation theory for thermal reactors. Prerequisites: Mathematics 601; Nuclear Engineering 601.

**605. Nuclear Measurements Laboratory. (2-3). Credit 3. I**

The basic techniques of nuclear measurements are discussed and practiced. The behavior of neutrons in multiplying and non-multiplying media is observed. Extensive use is made of the nuclear reactor. Prerequisite: Nuclear Engineering 601 or registration therein.

**606. Reactor Experimentation. (2-3). Credit 3. II**

The techniques of Nuclear Engineering 605 are utilized in measuring the properties of a nuclear reactor. Control rod and power calibrations are performed. The effects of scattering, absorption, and moderation on the reactor are determined. The reactor core is disassembled and a critical experiment performed. Prerequisites: Nuclear Engineering 602 or registration therein, 605.

**608. Thermonuclear Engineering. (3-0). Credit 3. II**

Fundamentals relative to the use of the fusion reaction as an energy source. Charged particle reactions. Reaction rates. Radiation losses. Transport theory for ionized gases. Liouville and Boltzmann equations. Macroscopic conservation laws and magnetohydrodynamics. Propagation of small amplitude waves. Instabilities. Confinement and heating problems. Diagnostics.

**610. Design of Nuclear Reactors. (3-0). Credit 3. II**

This course applies the fundamentals of nuclear physics and reactor theory with engineering fundamentals to the design of nuclear reactors. Prerequisites: Nuclear Engineering 601, 602 or registration therein.

**615. Nuclear Radiation Detection. (3-0). Credit 3. I**

The interaction of radiation with matter and the behavior of ion pairs in the presence of electric fields are discussed. The theory of operation is presented for the following radiation detection devices: ion chambers, proportional and G-M counters, scintillation detectors, Cerenkov counters, emulsions, cloud chambers, bubble chambers, and activation detectors. Prerequisite: Mathematics 307.

**618. Nuclear Control Systems. (3-0). Credit 3. II**

The fundamentals of servocontrol are developed and applied to a nuclear reactor. The safety aspects of reactor control and operational problems are discussed. Prerequisites: Nuclear Engineering 601, 602 or registration therein.

**621. Nuclear Metallurgy. (3-0). Credit 3. II**

The physical and metallurgical properties of metals used in nuclear reactors and the reasons for their use are considered. Prerequisite: Mechanical Engineering 409.

**622. Nuclear Power Plant Design and Analysis. (3-0). Credit 3. II**

This course is designed to present the application of nuclear reactor systems to the field of power production, utilizing the general fields of thermodynamics and heat transfer, along with special problems arising from a nuclear system. Prerequisites: Mechanical Engineering 323 or 328; Nuclear Engineering 601.

**623. Analytical Nuclear Engineering I. (3-0). Credit 3. I**

Unified analytical treatment of heat conduction in solids and thermal stress phenomena with application to nuclear energy sources. General and specialized formulations and methods of solution for predicting the response of solids to simultaneous thermal and external loads. Transient heat conduction in solids. Isothermal elasticity. Thermoelasticity. Viscoelasticity. Plasticity. Prerequisites: Mathematics 622 or 625; Nuclear Engineering 610; approval of the instructor.

**624. Analytical Nuclear Engineering II. (3-0). Credit 3. II**

Unified treatment of mass, momentum, and energy transport with applications to nuclear energy sources. Transport coefficients. General and specialized formulations of mass, momentum, and energy balances. Potential, Newtonian, and non-Newtonian flows. Velocity and temperature distributions in laminar and turbulent flow. Liquid metal heat transfer. Flow and thermal stability. Prerequisite: Nuclear Engineering 623.

**625. Nuclear Reactor Theory. (4-0). Credit 4. I**

Advanced treatment of neutron transport with and without spectrum regeneration. Integrodifferential and integral Boltzmann equations and their adjoints. Methods of solution including exact, complete set representations, integral transforms and numerical quadrature. Multigroup diffusion and transport theory. Spatially dependent and independent kinetics. Perturbation theory for steady state and transient phenomena. Prerequisites: Mathematics 602 or 617; Nuclear Engineering 602.

**626. Nuclear Reactor Theory. (4-0). Credit 4. II**

Continuation of Nuclear Engineering 625. Variational principles for discrete and continuous eigenvalues with applications to problems with and without spectrum regeneration. Milne problem and the Wiener-Hopf technique. Serber-Wilson and Feynman methods. Spatially independent and dependent slowing-down theory. Neutron thermalization in light and heavy elements. Prerequisite: Nuclear Engineering 625.

**681. Seminar. (1-0). Credit 1. I, II**

Special topics in nuclear engineering which are not covered by formal course work. Whenever possible, guest lecturers will discuss topics which they have personally investigated. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II**

This course is offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Oceanography and Meteorology

Professor D. F. Leipper,

Professors D. W. Hood, H. J. McLellan, V. E. Moyer, R. O. Reid; Associate Professors K. C. Brundidge, W. H. Clayton, J. D. Cochrane, G. A. Franceschini, L. S. Kornicker, A. H. Thompson; Assistant Professors E. E. Angino, C. W. Chien, R. A. Clark, S. Z. El-Sayed, J. F. Griffiths, W. K. Henry, S. M. Ray, T. E. Sanford; Instructors L. G. Cobb, W. D. Nowlin, Darryl Randerson

### METEOROLOGY

**305. General Meteorology. (3-0). Credit 3. I, II, S**

An introductory course in the science of the atmosphere, its composition, structure, and behavior. Emphasis is on fundamental concepts involving physical processes and air motions, and resulting effects on the state of the atmosphere: weather and climate. The course provides a background in meteorology for serious students of geophysical sciences. Prerequisites: Registration in Mathematics 307; Physics 202 or 219.

**315. Meteorological Instruments and Observations. (3-3). Credit 4. I, II**

Theory, design, and accuracy of meteorological instruments, including the theory and limitations of pilot-balloon, radiosonde, rawin, and radar observations and codes; global and local weather networks; methods and forms of data transmission; plotting of data. Meteorological charts and diagrams, data presentation; elementary data analysis. Prerequisites: Mathematics 121 or 209; Physics 202 or 219.

**324. Physical and Regional Climatology. (3-0). Credit 3. I, II**

A study of the climatic controls of the earth and physical basis for these controls. Climatic classifications of the earth and the geographic distributions of climate and air masses. Diurnal, seasonal, and long period variations of climate. Local climates, introduction to microclimates, and effects of climate on life. Prerequisite: Meteorology 305 or approval of the instructor.

**335. Atmospheric Statics and Thermodynamics. (2-0). Credit 2. I, II**

Geopotential; chemical composition of the atmosphere; the physical variables; the hydrostatic equation; hypsometry; thermodynamics of dry, moist, and saturated air; mixing and convection; thermodynamic charts and diagrams; thermodynamics applied to atmospheric analysis and weather processes. Prerequisites: Mathematics 122 or 210; Physics 202 or 219.

**336. Atmospheric Motions. (3-0). Credit 3. II, S**

Kinematics; conservation equations; equations of motion; geostrophic and accelerated motions; streamlines; trajectories; circulation and vorticity theorem; dynamics of wind systems. Prerequisites: Mathematics 307; Meteorology 335.

**425. Methods in Climatology. (3-3). Credit 4. I, II**

Sampling and analysis of time series of atmospheric parameters; objective forecasting; punched card techniques; significance and limitations of results. Prerequisite: Meteorology 324.

**435. Dynamic Meteorology. (3-0). Credit 3. I** †

A continuation of Meteorology 336 with emphasis on applications of the vorticity equation, the movement of barotropic and baroclinic pressure systems, elements of numerical weather prediction, perturbation equations, and the general circulation. Prerequisites: Mathematics 308; Meteorology 336.

**445. Atmospheric Physical Processes. (3-0). Credit 3. I, S**

The physics of heat, moisture, and momentum transfer in the atmosphere; radiation, evaporation, condensation, advection, convection, turbulence, and diffusion; their consequences upon the weather. Prerequisite: Meteorology 336.

**446. Physical Meteorology. (3-0). Credit 3. I, II, S**

Fog, cloud, and precipitation physics; thunderstorms; atmospheric electricity; optical and acoustical phenomena. Prerequisite: Meteorology 445.

**451. Fundamentals of Meteorological Analysis. (1-9). Credit 4. II, S**

Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies on the structure and time changes in extratropical weather systems. Applications to weather systems of the principles developed in the prerequisite and concurrent courses. Prerequisite: Meteorology 336 or registration therein.

**452. Weather Analysis and Prognosis. (1-6). Credit 3. I, S**

A continuation of Meteorology 451 with emphasis on time continuity and vertical consistency. Discussion of the tropopause and jet stream. Study of the major and minor waves and short and long range prognostic techniques. Prerequisite: Meteorology 451.

**453. Synoptic Meteorology. (1-6). Credit 3. I, II, S** †

A continuation of Meteorology 452 with emphasis on interpretation of weather events from analyzed and prognostic charts. Current weather is utilized on a local area chart. Weather elements are forecast. Weather briefing and presentation. Prerequisite: Meteorology 452.

**457. Fundamentals of Weather Analysis. (1-12). Credit 5. I**

Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies of the structure and motions of air currents, fronts, cyclones, anticyclones, pressure waves, tropical storms, and other features of the circulation. Prerequisite: Meteorology 336.

**458. Weather Analysis. (1-12). Credit 5. II** †

A continuation of Meteorology 457, but with the emphasis on motions of wind and weather patterns and on weather sequence. Introduction to principles and methods of prognosis. Prerequisites: Meteorology 445, 457.

**465. Agricultural Meteorology. (2-0). Credit 2. I** †

Study of principles of meteorology as they are related to agriculture, with special emphasis upon the climate of the surface layers of the atmosphere. Prerequisite: Approval of the instructor.

**467. Marine Meteorology. (3-0). Credit 3. I** †

Primary concern is with interactions between sea and air, and resulting modifications of the atmosphere and sea. Emphasis on energy budget and exchange relations employing hydrodynamic equations of conservation and transfer to determine fluxes and sources of atmospheric energy. Climatology of global exchanges and restricted area applications are considered. Prerequisite: Approval of the instructor.

**475. Radar Meteorology. (3-0). Credit 3. I, II** †

Study of the theory and practice of radar storm observations. Prerequisites: Meteorology 445, 451.

**479. Military Applications of Meteorology. (3-0). Credit 3. I, II** †

Applications of meteorological knowledge and data to related activities and problems in the national defense not under security classification. Prerequisite: Meteorology 451.

**481. Seminar. (1-0). Credit 1. II**

Presented by students and based upon surveys of the literature.

**485. Problems. Credit 1 to 3. I, II, S**

A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which are not covered by any other courses in the established curriculum.

## FOR GRADUATES

**600. Survey of Meteorology. (3-0). Credit 3. S**

A survey course in meteorology designed for teachers of secondary school science. Prerequisite: Approval of Heads of Departments of Oceanography and Meteorology and of Education and Psychology.

**615. Instrument Theory and Design. (3-0). Credit 3. II**

A study of modern methods of instrumentation as related to meteorology and allied geophysical fields; their basic concepts, design, use, and inherent errors. Prerequisite: Bachelor of Science degree in science or engineering.

**625. Applied Climatology. (3-0). Credit 3. I**

Practical application of fundamental climatology and microclimatology to various aspects of life such as botany, zoology, human physiology, engineering and hydrology, and the methods used to coordinate climatology with these other disciplines. Prerequisite: Meteorology 425 or approval of the instructor.

**636. Dynamic Meteorology. (3-0). Credit 3. II**

A formal treatment of the principles of fluid dynamics as they apply to the atmosphere; the Navier-Stokes equations; perturbation theory, energy equations and transformations, vorticity, barotropic and baroclinic systems, cyclone theories, and numerical weather prediction. Prerequisites: Mathematics 601; Meteorology 435.

**637. Numerical Weather Prediction. (3-0). Credit 3. I**

Numerical weather prediction: the scale of atmospheric motion; atmospheric modeling, stability, finite difference formulation and methods of solution; smoothing and filtering; accuracy of solutions; automatic processing of meteorological data; numerical solutions of boundary layer problems. Prerequisites: Mathematics 417; Meteorology 435.

**638. Meteorological Simulation. (2-3). Credit 3. I**

Introduction to uses of simulation techniques in meteorological research with laboratory practice utilizing general purpose electronic analog computer; review of general simulation techniques; problem material from all phases of meteorology with major emphasis on physical processes occurring at earth-atmosphere and ocean-atmosphere interface. Prerequisites: Mathematics 308; Meteorology 445; Physics 301; or approval of the instructor.

**645. Cloud and Precipitation Physics. (3-0). Credit 3. I**

The physics of clouds and precipitation: condensation in clean ion-free air; atmospheric condensation and deposition nuclei; formation and growth of droplets and snow crystals; physics of natural and artificially-stimulated precipitation; atmospheric and cloud electrification. Prerequisite: Meteorology 446.

**647. Meteorology of the Upper Atmosphere. (3-0). Credit 3. I**

Study of the composition, structure, and characteristic phenomena of the extratropospheric terrestrial atmosphere based on balloon, rocket, artificial satellite, and various indirect measurements. Prerequisite: Bachelor of Science degree in science or engineering.

**648. Cosmic Meteorology. (3-0). Credit 3. II**

Continuation of Meteorology 647. Examination of the properties and processes of the interplanetary plasma and of the atmospheres of the other planets; composition, structure, clouds, and circulations, and their implications in terrestrial meteorology. Prerequisite: Meteorology 647.

**657. Mesometeorology. (2-6). Credit 4. II**

Theory and analysis of mesoscale weather systems, including fronts, squall lines, tornadoes, thunderstorms, air-mass cumuli, and local circulation systems; the relation of mesoscale systems to individual cloud structures, which combine to form the mesoscale feature, and to large scale weather systems of which they are a part. Prerequisite: Meteorology 453 or approval of the Head of the Department.

**658. Synoptic Meteorology. (2-6). Credit 4. I**

Discussion, application, and critical evaluation of synoptic procedures employed for analyzing and forecasting macroscale atmospheric structure over periods up to several days; detailed studies of specific atmospheric phenomena; recent developments in synoptic meteorology. Prerequisites: Meteorology 453 or the equivalent.

**665. Micrometeorology. (3-0). Credit 3. II**

A study of the physical processes occurring at the interface between earth and atmosphere, with special emphases upon evaporation, turbulent diffusion of gases, variations in wind, temperature, and humidity in the lowest few meters of the atmosphere. Prerequisites: Mathematics 308; Meteorology 445; Physics 301.

**666. Agricultural Meteorology. (3-0). Credit 3. II**

Application of physical concepts of meteorology to problems arising in some aspects of agriculture and horticulture, with a detailed study of meso- and microclimates so that an appreciation of local variations may be made. Prerequisite: Meteorology 465.

**674. Radar Meteorology. (3-0). Credit 3. II**

Theoretical application of the principles of electromagnetic propagation, forward and back scattering, and polarization in cloud and precipitation physics and the detection and diagnosis of atmospheric parameters and phenomena. Prerequisite: Meteorology 475.

**676. Hydrometeorology. (3-0). Credit 3. II**

The role of weather and weather processes in land water problems. Prerequisite: Approval of the instructor.

**681. Seminar. (2-0). Credit 2. II, S**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## OCEANOGRAPHY

**201. Sea and Air Sciences. (1-0). Credit 1. I, II, S**

Oceanography and meteorology as scientific career fields. Features of the natural environment which affect man's daily life and activities. A survey course open to all college students.

**401. Introduction to Oceanography. (3-0). Credit 3. I, II, S** †

The various aspects of oceanography with emphasis upon those pertinent in the Gulf of Mexico. The principles upon which the disciplines of the subject are based. The unity of the marine sciences and their importance to man. The relations between oceanography and the fields of biology, chemistry, engineering, geography, geology, mathematics, meteorology, and physics. Opportunities in oceanography. Prerequisite: Senior classification in engineering or in a biological or physical science or the approval of the instructor.

**403. Tides, Waves, Currents, Ice. (3-0). Credit 3. II**

The elements of physical oceanography pertaining to marine transportation and navigation. Astronomical and meteorological tides, wind waves and swell, major ocean current systems, sea ice.

## FOR GRADUATES

**601. Research Methods in Oceanography. (1-0). Credit 1. I, II, S**

Selection of a research problem for thesis work; planning the program of investigation. Prerequisites: General prerequisites for oceanography.

**603. Sea Laboratory Techniques. (0-6). Credit 2. II**

Practice in techniques used regularly aboard ship and in collecting field data. Cruise planning, navigational methods, collection of hydrographic, bathymetric and meteorological data, sediment sampling, biological sampling, chemical analysis of water samples; current measurement by drogue and GEK; analysis of data. Prerequisites: General prerequisites for oceanography.

**610. Physical Oceanography. (3-0). Credit 3. I, II**

Survey of the physics of the sea; physical properties, transmission of light and sound in the sea, sea ice; heat budget of the sea and transformation of energy within the sea and at the boundaries; evaporation from the sea, description of water masses and their origin; the horizontal and vertical circulation of the seas; the applied dynamic and kinematic formulas for circulation in the sea; the concept of dynamic equilibrium of the different concentrations within the sea; introduction to waves and tides of the sea. Prerequisites: General prerequisites for oceanography.

**611. Theoretical Physical Oceanography. (3-0). Credit 3. II**

Theoretical and quantitative aspects; equations of motion; equation of continuity; boundary conditions; distribution of properties in the presence of diffusion; heat budget; stability; dynamics and computation of ocean currents; wind currents; thermodynamic considerations. Prerequisites: Mathematics 601 or registration therein; Oceanography 610 or approval of the instructor.

**612. Theory of Ocean Waves. (3-0). Credit 3. II**

Theory of simple harmonic surface waves; wave groups and group velocity, wave energy and energy propagation, dispersion. Theory of generation and decay of surface waves. Waves of large steepness, including solitary and cnoidal waves. Modification of waves in shallow water, refraction; wave ray analysis and the phase diagram. Capillary waves; internal waves and shear waves. Prerequisites: Mathematics 308 (Mathematics 601 recommended); Oceanography 610.

**613. Engineering Aspects of Oceanography. (3-0). Credit 3. I**

Applications of oceanographic knowledge in engineering. Sea disturbances, astronomical tides, seismic sea waves, seiches, surging in harbors, wind generation of ocean waves. Practical wave forecasting; wave refraction diagram analysis; propagation of waves in shallow water, breaking waves. Principles of similitude, fluid resistance, wave forces on fixed and floating structures. Prerequisites: Mathematics 308; Oceanography 610.

**614. Dynamics of the Ocean and Atmosphere. (3-0). Credit 3. I**

Advanced theory of the ocean dynamics, a comparison of the hydrodynamic and thermodynamic character of the ocean and the atmosphere; the mutual dependence of the dynamics and thermodynamics of the sea on those of the air and vice versa; some special theories from the mean equations of motion, gradient wind, jet stream, mutual adjustment of the mass field and velocity field in the sea; mutually coupled temperature variations of the sea and the air; wind driven currents; the general hydrodynamic problem of the ocean and of the atmosphere, and an investigation of its uniqueness; the maintenance of the general circulation. Prerequisites: Mathematics 602; Oceanography 611. (Offered in 1963-64 and in alternate years thereafter.)

**620. Biological Oceanography. (3-0). Credit 3. II**

Critical study of important contributions defining major biological divisions, provinces, and life zones of the oceans; effects of climate, chemical, and physical barriers, and phylogeny on zoogeography; factors relating to population cycles; productivity problems; ecological inter-relationships of major groups of plants and animals in the sea. Prerequisites: General prerequisites for oceanography.

**621. Biological Oceanography of the Gulf of Mexico. (1-6). Credit 3. I**

Detailed examination of selected aspects of biological oceanography which are of major importance to the Gulf of Mexico. Prerequisite: Undergraduate major in biology or approval of the instructor.

**630. Geological Oceanography. (3-0). Credit 3. I**

Topography and characteristic features of the ocean bottoms; marine shorelines and processes operating in the coastal zone; nature of marine sediments; marine transportation and deposition of sedimentary materials; erosion of beaches. Prerequisite: General prerequisites for oceanography or approval of the instructor.

**631. Geological Oceanography of the Gulf of Mexico. (2-3). Credit 3. II**

Carbonate sedimentation and coral reefs; processes involved in sediment transport and deposition; structure of ocean basins; effects of sea level changes on sedimentation and topography; origin of topographic features. Prerequisites: Undergraduate major in geology or approval of the instructor.

**640. Chemical Oceanography. (3-0). Credit 3. II**

The chemical composition and properties of sea water; the definition and calculation of salinity; the pH, excess base, and carbon dioxide system in the sea; nutrients, their cycles and their distribution; oxygen and other dissolved gases; chemistry of sedimentation; composition of organisms and organic constituents of sea water; marine corrosion; extraction of raw materials from the sea. Prerequisites: General prerequisites for oceanography.

**641. Chemical Oceanography. (3-0). Credit 3. I**

Detailed study of selected topics in chemical oceanography which pertain to the Gulf of Mexico; industrial utilization of sea water and chemical products obtained from marine plants and animals; water freshening; industrial corrosion problems; chemical aspects of photosynthesis and fertility of the sea; chemistry of estuarine waters. Prerequisite: Undergraduate major in chemistry or approval of the instructor.

**642. Laboratory Techniques in Oceanography. (0-6). Credit 2. II**

Detailed study will be made of methods of preparation and analysis of samples for biological, chemical, and geological investigations. The methods of analysis will concern oxygen, phosphate, silicate, nitrate, nitrite, salinity, carbon, sediment particle size, mineralogy, organic production, and others. Prerequisites: Oceanography 603, 610, 620, 630, 640, or approval of the instructor.

**643. Geochemistry of the Ocean. (3-0). Credit 3. I**

Geochemistry of the oceanic hydrosphere, biosphere, and lithosphere; how these are related to the atmosphere; study of the elements within them. Prerequisites: Oceanography 630, 640 or 641 or graduate classification in geology. (Offered in 1963-64 and in alternate years thereafter.)

**644. Geochemistry of the Ocean. (3-0). Credit 3. II**

A detailed critical study of the geochemistry of sedimentation, the geochemical evolution of the ocean, the biogeochemistry of calcium carbonate and isotope geochemistry as related to the ocean. Prerequisite: Oceanography 643. (Offered in 1963-64 and in alternate years thereafter.)

**651. Meteorological Oceanography. (1-3). Credit 2. I**

The use of the conservative characteristics of the sea in forecasting meteorological and oceanographic phenomena. Calculation of ocean waves and swell, transformation of waves in shallow water, statistical summaries, modification of air masses in contact with the ocean, forecasting of fog and squalls, effect of the oceans upon climate of the world, meteorological tides. Prerequisite: Oceanography 610.

**652. Ocean Boundary Layer Problems. (3-0). Credit 3. I**

Theory of radiative exchange of energy at the sea surface; the theory of turbulent flow over hydrodynamically rough and smooth surfaces with application to the evaluation of the fluid frictional stresses at the boundaries of the sea, the evaluation of wind stress, evaporation, etc; the micro-structure of temperature and salinity near the ocean surface; evaluation of turbulent exchange coefficient. Nature of turbulence and associated dispersion phenomena. Prerequisite: Oceanography 611. Mathematics 411 or 414 recommended. (Offered in 1964-65 and in alternate years thereafter.)

**681. Seminar. (2-0). Credit 2. I**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in oceanography to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum. An example of the solution of a special problem in oceanography would be the work done in analyzing a special set of data collected on a cruise at sea. The course may also consist of a special series of problem discussions not given periodically, such as those offered by visiting scientists. Prerequisite: General prerequisites for oceanography.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## Department of Petroleum Engineering

Professor R. L. Whiting,
Professors J. W. Amyx, J. C. Calhoun, Jr., P. B. Crawford, H. T. Kennedy;
Associate Professor J. R. Pedigo

**300. Petroleum Engineering Field Problems. (1-6). Credit 3. S**

A field study of the problems encountered in oil and gas fields. Course consists primarily of visits to oil and gas fields. The requirements of this course will not permit a student to take any other course at the same time. Prerequisite: Completion of junior petroleum engineering courses.

NOTE: This course may be taken in place of field work as required of all graduates in petroleum engineering. Field work or this course required before registration in any of the senior or fifth year petroleum engineering courses.

**305. Petroleum Development. (2-0). Credit 2. I**

Principles of oil field development, rotary and cable tool drilling methods, drilling fluids, oil field hydrology. Prerequisites: Geology 201, 207; Mathematics 307; Physics 219.

**306. Reservoir Rock Properties. (2-0). Credit 2. II**

A systematic study of the physical properties of petroleum reservoir rocks with particular emphasis on porosity, permeability, relative permeability, capillary characteristics, homogeneous and heterogeneous rock systems. Prerequisites: Petroleum Engineering 305, 307.

**307. Petroleum Development Laboratory. (0-3). Credit 1. I**

Properties of petroleum; operation of rotary drilling rig; well surveying practices; tests on drilling fluids and cements. Prerequisite: Petroleum Engineering 305 or registration therein.

**308. Rock and Fluid Properties Laboratory. (0-3). Credit 1. II**

Core analysis, capillary pressure and relative permeability tests, fluid displacement tests; differential and flash vaporization tests of gas saturated crude oil at elevated pressure and temperature. Prerequisites: Petroleum Engineering 306, 310, or registration therein.

**310. Reservoir Fluids. (3-0). Credit 3. II**

Thermodynamic behavior of natural occurring hydrocarbon mixtures. Evaluation and correlation of physical properties of petroleum reservoir fluids, laboratory and empirical methods. Prerequisites: Chemistry 323; Petroleum Engineering 305, 307.

**312. Well Logging. (1-0). Credit 1. II**

A preliminary study of logging methods with particular attention to electric logging and radioactive logging as they would be applied in the petroleum industry. Prerequisite: Geology 210.

**402. Petroleum Property Management. (3-0). Credit 3. II** †

Factors which influence the value of oil and gas properties; preparation of valuation reports, cost data, operating organization, regulation of petroleum production. Prerequisites: Petroleum Engineering 409, 413, 428.

**405. Drilling and Production Design. (2-2). Credit 3. I** †

A study of the selection of drilling and production equipment used in oil field practice. Design of drilling and production systems. Prerequisites: Civil Engineering 305; Petroleum Engineering 305, 306, 307, 308, 310, 312.

**409. Subsurface Engineering. (1-3). Credit 2. I** †

Well logging, contour maps, isopachous maps, and the determination of the size, shape, and volume content of petroleum reservoirs. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**413. Petroleum Measurement and Transportation. (2-2). Credit 3. I** †

Theory and methods of gas and liquid measurements and transportation including mixed streams, horizontal and vertical flow, etc. Prerequisites: Mechanical Engineering 346; Petroleum Engineering 310.

**414. Petroleum Production Engineering. (2-0). Credit 2. II** †

Gas lift, surface separation and treatment of oil field fluids. The measurement, sampling and testing of crude oil, tank strapping and preparation of tank tables, oil storage, the prevention of loss by evaporation, fire and lightning protection. Prerequisites: Petroleum Engineering 405, 413.

**415. Measurements Laboratory. (0-3). Credit 1. I** †

Methods of metering petroleum and natural gas. Study of flow of liquid gas and mixtures of gas and liquid. Advanced study of properties of petroleum at elevated pressure and temperature. Prerequisite: Petroleum Engineering 413 or registration therein.

**416. Oil Measurements and Transportation Laboratory. (0-3). Credit 1. II** †

Gauging practices, treating of oil-water emulsion, heat and sulphur content of petroleum and its products, determination of viscosity, gravity, water content, carbon residue, and the coefficient of expansion of petroleum. Determination of vapor pressure of natural gasoline. Distillation of crude oil and gasoline. Methods of metering petroleum. Water analysis. Prerequisite: Petroleum Engineering 414 or registration therein.

**419. Drilling Fluids. (0-3). Credit 1. II** †

A laboratory course in which field technique and control of mud fluids to facilitate drilling are taught. Prerequisites: Senior classification in petroleum engineering; approval of the Head of the Department.

**428. Reservoir Engineering. (2-0). Credit 2. I** †

Material balance methods, including identification of type of reservoir mechanism, future production under primary recovery and gas injection; water influx calculations. Prerequisites: Petroleum Engineering 306, 308, 310.

**429. Reservoir Mechanics Laboratory. (0-3). Credit 1. I** †

A laboratory course to supplement the theory of Petroleum Engineering 428. Advanced core analysis; fundamental tests of PVT properties of petroleum at reservoir conditions. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310.

**438. Reservoir Engineering. (2-0). Credit 2. II** †

Continuation of Petroleum Engineering 428. Displacement of oil by extraneous fluids, evaluation of performance of combination drive reservoirs, sweep efficiency. Prerequisite: Petroleum Engineering 428.

**481. Petroleum Engineering Seminar. (0-2). Credit 1. I** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**482. Petroleum Engineering Seminar. (0-2). Credit 1. II** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

## FOR GRADUATES

**601, 602. Drilling and Completing Wells. (3-3). Credit 4 each semester. S**

An advanced study of the problems encountered in the drilling and completing of oil and gas wells. Prerequisite: Approval of Head of Department.

**603, 604. Advanced Reservoir Engineering. (3-3). Credit 4 each semester. I, II**

An advanced course in petroleum production practices with special reference to the fundamental principles of flow of reservoir fluids. Prerequisite: Approval of Head of Department.

**605. Phase Behavior of Petroleum Reservoir Fluids. Credit 2 to 4 each semester. I**

A study of the pressure, volume, temperature, composition relationships of petroleum reservoir fluids. Prerequisite: Approval of Head of Department.

**607. Recovery Methods. Credit 2 to 4 each semester. II**

A study of methods of increasing recovery of petroleum from petroleum reservoirs. Prerequisite: Approval of Head of Department.

**608. Well Logging Methods. (2-3). Credit 3. II**

An advanced study of well logging methods for determining the nature and fluid content of formations penetrated by the drill. Prerequisite: Approval of Head of Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A study and presentation of papers on recent developments in reservoir mechanics. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II**

A course offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Advanced work on some special problem within the field of petroleum engineering. A thesis course. Prerequisite: Approval of the Head of Department.

## Department of Physics

Professor J. G. Potter,
Professors J. B. Coon, Melvin Eisner, C. F. Squire, D. F. Weekes; Associate Professors P. W. Barker, B. B. Boriskie, N. M. Duller, Jr., J. A. Eisele, J. S. Ham; Assistant Professors J. P. Decker, H. S. Hans, R. A. Kane, C. M. Loyd, O. D. Sittler; Instructors J. A. Barnes, H. C. Boehme, W. G. Cantrell, J. G. Couch, R. M. Henson, A. D. MacKellar, Eddie Reyna, R. E. Smith,
D. R. Wiff, B. T. Young

Students who present for transfer courses in college physics of less credit value than the required courses in this college may validate their transfer work and receive credit in physics by examination if they wish to do so.

Normally, however, students transferring with from 8 to 10 hours of physics into curricula requiring 12 hours should register for Physics 220.

**201. College Physics. (3-3). Credit 4. I, II, S**

An elementary course with material selected especially with reference to the needs of premedical, predental, and pre-veterinary medical students and students of architecture and education. Fundamentals of classical mechanics, heat and sound. Prerequisite: Mathematics 103.

**202. College Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

**211. A Brief Survey of Physics. (3-3). Credit 4. II**

A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 102.

**213. Physics for Students of Agriculture. (2-2). Credit 3. I, II**

A brief course emphasizing fundamentals of special importance to students of agriculture in the fields of mechanics, heat, light, and electricity. Prerequisite: Mathematics 102.

**215. Introductory Physics. (2-3). Credit 3. I**

A course for pre-veterinary medicine students restricted to those topics in physics of importance to all students of veterinary medicine. The material of the first semester is in the fields of mechanics, heat, and sound. Laboratory exercises emphasize measurements, concepts, and the experimental basis of physics. Prerequisites: Mathematics 102, 103.

**216. Introductory Physics. (2-3). Credit 3. II**

A continuation of Physics 215. The material of the second semester is in the fields of light, magnetism and electricity, and atomic, molecular, and nuclear phenomena. Prerequisite: Physics 215.

**218. Mechanics and Heat. (3-3). Credit 4. I, II, S**

A comprehensive course for students of engineering and the physical sciences, providing the background for many of the engineering courses as well as for other physics courses. Cultivation of the capacity to utilize the fundamental concepts in the solution of problems is emphasized. Mechanics and heat. Prerequisite: Mathematics 121 or 209 or registration therein.

**219. Sound, Light, Electricity. (3-3). Credit 4. I, II, S**

A continuation of Physics 218. Sound, light, and electricity. Prerequisites: Mathematics 121 or 209; Physics 218.

**220. Modern Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 218 and 219. Atomic physics, nuclear physics, and solid state physics. Prerequisites: Mathematics 122 or 210; Physics 219.

**301. Heat. (3-0). Credit 3. I** †

Heat transfer, specific heats, development of thermodynamic concepts introducing statistical mechanics and kinetic theory, phase and change of state, and radiation. Prerequisites: Mathematics 307; Physics 220.

**302. Mechanical Properties of Matter. (3-0). Credit 3. II, S** †

Fundamentals of mechanics of particles, liquids, and solids. Prerequisites: Mathematics 308 or registration therein; Physics 218.

**310. Applications of Modern Physics. (2-2). Credit 3. I, S**

A comparatively non-technical survey of modern applications of atomic and nuclear phenomena of interest to students of geology, biochemistry, genetics, biology, engineering, education, and especially premedical and predental students. Electrons, ions, isotopes, spectra, x-rays, atomic structure, radioactivity, atomic particles, nuclear accelerators, induced radioactivity, radioactive tracers, nuclear reactors, and atomic energy. Some demonstration laboratory work will accompany certain phases of the course. Prerequisites: Chemistry 101 or 103; Physics 202 or 219.

**311. Atomic and Nuclear Physics. (3-0). Credit 3. I** †

Atomic and nuclear phenomena and structures, relativity, quantum mechanics, fundamental particles. Prerequisite: Physics 220.

**314. Survey of Astronomy. (3-0). Credit 3. I, II, S**

A study of the solar system, meteors, asteroids, comets, stars, clusters, nebulae, Kepler's laws, laws of gravitation, astronomical instruments. Occasional evening meetings will be held for observation. Prerequisites: Mathematics 102, 103.

**317. Celestial Mechanics. (4-0). Credit 4. I** †

A mathematical formulation of the principles of celestial mechanics, central forces, potentials and attractions of bodies, the problem of two bodies, the problem of three bodies, the problem of **n** bodies. Prerequisites: Mathematics 307; Physics 201 or 218.

**322. Intermediate College Physics. (4-6). Credit 6. I, II, S**

A course for high school and junior high school science teachers and elementary science supervisors designed to fortify their preparation to a level where they can pursue upper division specialized physics courses. A review of classical physics and a brief introduction to modern physics. Prerequisite: At least six hours of credit in college physics.

**323. Topics in Electricity and Electronics. (2-3). Credit 3. S**

Topics will be treated which high school and junior high school science teachers and elementary science supervisors will be able to pursue in the instruction in their schools. Prerequisites: Mathematics 122 or 210; Physics 202, 219, or 322.

**325. Physics Laboratory. (0-3). Credit 1. I**

Experimental studies primarily in physical optics, but also some in geometrical optics and in heat, pertaining mostly to the material in Physics 301 and Physics 401. Prerequisite: Registration in Physics 401.

**326. Physics Laboratory. (0-3). Credit 1. II**

Experimental studies primarily in electricity, magnetism, and electronics, pertaining to the material in Physics 413, but some experiments may be pursued in non-electrical instrumentation and in the mechanics and properties of matter treated in Physics 302. Prerequisite: Registration in Physics 413.

**401. Optics. (3-0). Credit 3. I** †

A systematic treatment of physical and geometrical optics, applications to optical instruments. Prerequisites: Mathematics 122 or 210; Physics 220.

**405. Physical Mechanics. (3-0). Credit 3. I** †

A comprehensive formulation of the principles of mechanics, employing the calculus and vectoral methods. Orbital motion, Coriolis acceleration, motions of rigid bodies, vibrations. Introduction to advanced mechanics. Prerequisites: Mathematics 405 or registration therein; Physics 302 or the equivalent.

**413. Electricity and Magnetism. (3-0). Credit 3. II** †

DC and AC circuit theory including some electronic circuits and electrical instruments. Prerequisites: Mathematics 308; Physics 219.

**414. Electricity and Magnetism. (1-3). Credit 2. I** †

Non-linear circuits, functions of tubes and transistors in electrical circuits, electronic circuits and circuit elements for physical measurements. Prerequisite: Physics 413 or approval of the instructor.

**416. Electromagnetic Fields. (3-0). Credit 3. II** †

Electric and magnetic field theory with emphasis on vector analysis and culminating in an introduction to electromagnetic radiation; properties of dielectrics and magnetic materials. Prerequisites: Mathematics 405 or 601; Physics 413 or approval of the instructor.

**418. Theoretical Physics. (3-0). Credit 3. II** †

An introduction to theoretical physics with emphasis on fundamental concepts and general principles. Prerequisites: Mathematics 307; Physics 219.

**420. Introduction to Astrophysics. (3-0). Credit 3. II** †

An introduction to the theory and application of astrophysics. The physics of the sun's core, the internal structure of stars, spectroscopic and dynamic aspects of stellar atmospheres, radiation from the sun and stars, interstellar matter, the origin and evolution of planetary atmospheres. Prerequisites: Mathematics 307 or registration therein; Physics 220, 314, and a course in heat or thermodynamics.

**421. Celestial Mechanics. (3-0). Credit 3. II** †

A continuation of Physics 317. The laws of binary star systems, the determination of orbits, perturbations of the moon, general perturbations, the problem of satellites. Prerequisite: Physics 317.

**424. Physics of Solids. (3-0). Credit 3. II**

An examination of the modern theories of crystalline structure, specific heats, dielectric properties, conduction, semiconduction and work function phenomena, magnetism, and dispersion in solids. Prerequisite: Physics 311.

**425. Physics Laboratory. (0-3). Credit 1. I**

Classical experiments in nuclear, atomic, and molecular physics, and electromagnetic waves, employing modern instrumentation and often the specialized equipment in use in current research. Prerequisites: Senior classification in the physical sciences or engineering.

**426. Physics Laboratory. (0-3). Credit 1. II**

Primarily experiments in solid and liquid state physics. Modern instrumentation is emphasized and set-ups currently used in research are employed in many instances. Prerequisite: Registration in Physics 424.

**427. Electrical and Electronic Circuits. (2-3). Credit 3. S**

DC and AC circuit theory, electrical measurements, introduction to electronics and electronic circuits. Prerequisites: Mathematics 308; Physics 219.

**430. Introduction to Biophysics. (3-0). Credit 3. I**

Introduction to the application of physical principles to the study and analysis of living systems. The nervous system and special sensory systems; enzyme kinetics; thermodynamics of biological systems; active transport processes; modern instrumentation in research. Prerequisite: Physics 202, 216, or 219.

**485. Problems. Credit 1 to 4. I, II, S**

Special work to meet individual or small group requirements in unusual cases not covered by the regular curriculum. It may be work in either laboratory or theory. Prerequisites: Approval of Head of Department.

## FOR GRADUATES

**600. Physics for Secondary School Teachers. (2-3). Credit 3. S**

This course taught by members of the Physics faculty will aim to develop convictions concerning the fundamental principles of classical and modern physics which should be taught in a course in high school physics and to develop techniques and methods of preparing and conducting demonstrations and laboratory exercises. Prerequisites: Graduate classification; approval of the Heads of the Education and Psychology and Physics Departments.

**601. Analytical Mechanics. (4-0). Credit 4. I, S**

Dynamics of particles and of rigid bodies, gyrodynamics, potential theory, Hamilton's principle, principle of least action. LaGrange's equations, and the Hamilton-Jacobi equation, with applications. Prerequisites: Mathematics 405 or 601; Physics 405.

**602. Fluid Mechanics and Elasticity. (4-0). Credit 4. I**

Mechanics of continuous media. Foundations of elasticity with application to theory of beams, plates, and shells. Hydrodynamics of viscous and nonviscous fluids. Supersonic flow and shock wave propagation. Boundary layer theory. Lubrication theory. Prerequisite: Physics 601 or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**603. Electromagnetic Theory. (4-0). Credit 4. II**

Theory of electromagnetism; static and time-varying fields; propagation, reflection, and refraction of electromagnetic waves. Prerequisites: Mathematics 601 or the equivalent; Physics 416 or the equivalent.

**605. Thermodynamics. (4-0). Credit 4. II**

The fundamentals of classical thermodynamics, including the first and second laws, thermodynamic potentials, conditions for equilibrium, properties of gases; thermodynamics of electromagnetic systems, and a brief treatment of kinetic theory including Maxwell's velocity distribution law, viscosity, and diffusion. Prerequisites: Mathematics 308; Physics 301 or the equivalent.

**607. Statistical Mechanics. (4-0). Credit 4. II**

Fundamentals of classical and quantum statistical methods and the application to physical systems. The statistical basis of entropy; the specific heats of gases and crystals; electronic phenomena in metals; super-fluidity; black-body radiation; and other applications to atomic and nuclear physics. Prerequisite: Approval of the instructor.

**611. Advanced Optics. (4-0). Credit 4. I**

The electromagnetic theory of optical phenomena in discontinuous, isotropic, and anisotropic media. Prerequisite: Physics 603. (Offered in 1963-64 and in alternate years thereafter.)

**612. Atomic Structure. (3-0). Credit 3. I, S**

A study of the atom and atomic spectra from the quantum mechanical viewpoint including the hydrogen atom, perturbation method, complex atoms, transition probabilities, angular momentum operators, multiplet structure of energy levels, fine structure and electron spin. Prerequisites: Mathematics 308 or the equivalent; Physics 311.

**614. Molecular Structure. (4-0). Credit 4. II**

The quantum mechanical theory of valence; the hydrogen molecule ion, molecular orbitals for diatomic molecules; the hydrogen molecule; coulombic and exchange integrals; Pauli exclusion principle and the covalent bond; hybrid atomic orbitals; general molecular orbital method. Prerequisite: Physics 612. (Offered in 1963-64 and in alternate years thereafter.)

**617. Physics of the Solid State. (3-0). Credit 3. I, S**

A study of the electrical, magnetic, thermal, and mechanical properties of crystalline solids. Lattice energy of ionic crystals, lattice vibrations, dielectric phenomena, luminescence and phosphorescence, electron theory of metals, band theory, semi-conductors, low temperature behavior of solids. Prerequisites: Mathematics 308, 405 or the equivalent; Physics 220 or the equivalent.

**618. Nuclear Theory. (3-0). Credit 3. I**

Application of quantum mechanics to nuclear phenomena. Prerequisites: Physics 623, 625, or the equivalent.

**623. Quantum Mechanics. (4-0). Credit 4. II**

Foundations of quantum mechanics; theories of Heisenberg and De Broglie with applications especially to nuclear physics. Prerequisites: Mathematics 602 or the equivalent; Physics 601, 612, 625.

**624. Quantum Mechanics. (4-0). Credit 4. I**

A continuation of Physics 623. A postulational development of the foundations of quantum mechanics; classical foundations, Hamiltonian formalism, canonical transformations, representation and expansion theory, relativistic-quantum mechanics, quantum electrodynamics, quantum field theory, fundamental particles, meson field theories, and high energy phenomena. Prerequisite: Physics 623.

**625. Nuclear Structure. (3-0). Credit 3. II**

Properties of fundamental particles; theory of simple nuclear models; scattering, spins, magnetic moments and cross sections; alpha, beta, and gamma decay; detection, measurement, and production of nuclear particles; nuclear spectroscopy; interactions of nuclear radiations with matter; nuclear reactions; high energy nuclear phenomena. Prerequisites: Mathematics 308, 601; Physics 311 or the equivalent.

**627. Relativity. (3-0). Credit 3. S**

Special relativity and its application to covariant formulations of mechanics and electrodynamics. Theory of general relativity including development of necessary tensor calculus and non-Euclidean geometry. Predictions of general relativity and experimental tests of theory; cosmological problems and unified field theories. Prerequisites: Physics 601, 603. (Offered in 1963-64 and in alternate years thereafter.)

**631. Quantum Theory of Solids. (3-0). Credit 3. S**

Development of solid state theory from the basic theory of quantum mechanics. Theory of perfect and imperfect crystal lattices. Interaction of electromagnetic radiation with non-conducting crystals. Electrons in perfect crystal lattices. Theory of metallic cohesion. Transport phenomena. Electric and magnetic properties of solids. Semiconductors, superconductors, superfluids. Prerequisite: Physics 617.

**633. Experimental Physics. (0-3). Credit 1. I, II, S**

Experiments in atomic, nuclear, and solid state physics, designed to complement theory courses in these fields and to prepare the student for experimental research in physics. Prerequisite: Graduate classification.

**661. Radiological Physics. (3-0). Credit 3. II**

Interaction of radiation with matter, health physics and radiation protection, reactor sources of radiation, shield design. Prerequisites: Mathematics 308; Nuclear Engineering 401 or Physics 311.

**663. Reactor Theory. (3-0). Credit 3. I**

Mathematical theory of the diffusion and slowing down of neutrons in the homogeneous nuclear reactor without reflector and with reflector. Prerequisites: Mathematics 308, 601 or registration therein; Physics 311.

**664. Reactor Theory. (3-0). Credit 3. II**

A continuation of Physics 663. The steady state and transient behavior of the heterogeneous reactor. Theory of reactor control. Special mathematical methods in reactor analysis. Extensive problem work to illustrate the applications of the theory. Prerequisites: Mathematics 602 or registration therein; Physics 663.

**665. Theory of Accelerators. (3-0). Credit 3. II**

Description and classification of accelerators. Cockcraft-Walton accelerators, electrostatic generators; linear accelerators; theory of magnetic focusing; cyclotron; theory of electrostatic focusing; stability conditions, betatron; synchrocyclotron; synchrotron; low energy pulse devices; energy measurement and control; instrumentation and techniques; reactions; radiological safety. Prerequisites: Mathematics 307; Physics 311.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems not related to thesis.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Plant Sciences

Professor D. W. Rosberg,
Professors T. C. Cartwright, W. C. Hall, H. E. Joham, R. G. Langston, R. G. Reeves, G. M. Watkins; Associate Professors L. S. Bird, W. W. Heck, W. H. Thames, Jr.; Assistant Professors L. J. Ashworth, Jr., J. E. Endrizzi, M. C. Futrell, R. S. Halliwell, N. A. McNiel, C. S. Miller, P. W. Morgan, J. D. Smith

### GENETICS SECTION

**301. Genetics. (3-2). Credit 4. I, II, S** †

Fundamental principles of genetics; variation, heredity, the physical basis of Mendelian inheritance, the expression and interaction of genes, linkage, sex linkage, and mutation. Laboratory includes demonstrations of Mendelian ratios with Drosophila and an introduction to biometrical methods. Prerequisite: Biology 101 or 107.

**Agronomy 304. Plant Breeding. (3-2). Credit 4. II** †

See Department of Soil and Crop Sciences for a full description of this course.

**Animal Husbandry 306. Animal Breeding. (2-2). Credit 3. I, II** †

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 414. Poultry Breeding. (2-2). Credit 3. I** †

See Department of Poultry Science for a full description of this course.

**Statistics 406. Statistical Methods. (2-2). Credit 3. I, II, S**

See Institute of Statistics for a full description of this course.

### FOR GRADUATES

**603. Genetics. (3-0). Credit 3. I**

Advanced study of genetics with special attention focused on the evidence supporting the principles of heredity. Development of fundamental concepts including dominance, the chromosome theory of heredity and linkage, sexuality, mutation and position effect, the gene concept and extra nuclear inheritance. Prerequisites: Genetics 301; approval of the instructor.

**604. Genetics Laboratory. (0-3). Credit 1. I**
Inheritance studies principally with Drosophila including laboratory techniques and methods. Arranged to complement Genetics 603 and required for genetics majors.

**612. Plant Genetics. (3-3). Credit 4. II**
Specialized study of genetics as related to plant breeding. Emphasis is placed on quantitative inheritance, heterosis, selection, ploidy, reproductive systems and the processing of quantitative data. Prerequisites: Genetics 304, 603.

**620. Cytogenetics. (3-3). Credit 4. II**
A study of correlated genetical and cytological phenomena. Prerequisites: Biology 615; Genetics 301.

**623. Special Topics in Genetics. Credit 1 to 3. I**
Content of this course will depend upon the interest of the students and the speciality of the instructor. Lecturers who have attained distinction in genetics or related fields will conduct this course.

**624. Statistical Genetics. (2-0). Credit 2. I**
Probability as applied to genetic systems; the derivation of genetic expectations; the theory of inbreeding; estimation and testing of genetic parameters; statistical aspects of quantitative inheritance; the partition of variance; covariances among relatives; mathematical models for quantitative inheritance. Prerequisites: Genetics 603; approval of the instructor. (Offered in 1964-65 and in alternate years thereafter.)

**625. Speciation. (2-0). Credit 2. I**
A study of the genetic and environmental forces which operate in species formation together with a critical examination and comparison of the more important current explanations of speciation. Prerequisites: Biology 349; Genetics 301. (Offered in 1964-65 and in alternate years thereafter.)

**631. Biochemical Genetics. (2-0). Credit 2. I**
A study of the genetic control of cellular metabolism and a theoretical consideration of the mechanism of gene action. A consideration of nutrition and the genetic capacity for biosynthesis, gene-enzyme relationships, pleiotropism, plasmagenes, and the chemical nature of the agents of heredity. Prerequisites: Biochemistry and Nutrition 410 or Chemistry 227; Genetics 301.

**633. Forest Genetics. (2-0). Credit 2. I**
Specialized study of genetics as applied to forest trees; forest genetics, forest tree improvement and forest tree breeding, with emphasis on genetics of conifers, especially pines. Fundamental and applied phases are included. Prerequisites: Genetics 603; approval of the instructor. (Offered in 1964-65 and in alternate years thereafter.)

**634. Forest Genetics Laboratory. (0-3). Credit 1. II**
Methods and techniques in forest genetics, forest tree breeding; crossing, grafting, air layering, field layouts, seed handling, greenhouse techniques. Prerequisite: Genetics 633. (Offered in 1964-65 and in alternate years thereafter.)

**685. Problems. Credit 1 to 4 each semester. I, II, S**
Technical research problems subject to approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**
Prerequisite: Genetics 603.

**Animal Husbandry 616. Animal Genetics. (3-3). Credit 4. II**

See Department of Animal Husbandry for a full description of this course.

**Animal Husbandry 628. Animal Breeding. (2-0). Credit 2. I**

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

See Department of Poultry Science for a full description of this course.

**Statistics 605. Statistical Analysis. (3-3). Credit 4. I, II**

See Institute of Statistics for a full description of this course.

## PLANT PHYSIOLOGY AND PATHOLOGY SECTION

**301. Plant Pathology. (2-3). Credit 3. I**

An introduction to the fundamental principles of plant pathology, including diagnosis, cause, and control of plant diseases. Prerequisites: Biology 101, 206.

**302. Plant Disease Diagnosis. (0-3). Credit 1. II**

A practice course designed to give the student experience in diagnosing plant disease problems. All categories of plant diseases will be studied. Prerequisite: Plant Physiology and Pathology 301 or approval of the instructor.

**313. Introduction to Plant Physiology. (2-3). Credit 3. I**

A general course dealing with the principal life processes of the higher plants, with particular emphasis on the influence of environmental factors on the processes and development of crop plants. Prerequisites: Biology 101; Chemistry 102 or 104.

**314. Principles of Plant Physiology. (3-3). Credit 4. II** †

A more advanced and detailed study of the physiology of green plants than Plant Physiology and Pathology 313, with emphasis on nitrogen metabolism, respiration, mineral nutrition, photosynthesis, and growth. Prerequisites: Chemistry 231; Physics 213; Plant Physiology and Pathology 313.

## FOR GRADUATES

**605. Plant Metabolism. (3-0). Credit 3. I**

Photosynthesis and respiration are discussed in detail, including the history and recent developments in these fields. Prerequisites: Plant Physiology and Pathology 314; approval of instructor. (Offered in 1963-64 and in alternate years thereafter.)

**607. Physiology of the Fungi. (3-0). Credit 3. II**

A general course in the physiological activities of fungi, including growth and development, mineral nutrition, carbon and vitamin nutrition, the chemistry of metabolic products, fungicides, and the physiology of parasitism and resistance. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1963-64 and in alternate years thereafter.)

**609. Quantitative Plant Physiology. (2-6). Credit 4. II**

Methods employed in the various types of physiological investigations and interpretation of results obtained by them. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1963-64 and in alternate years thereafter.)

**611. Plant Nutrition. (3-0). Credit 3. II**

This course deals with the inorganic nutrition of plants. It includes solute absorption, accumulation and translocation; growth of plants in artificial media; physiological roles of various elements in the plant, and biochemical problems associated with salt absorption. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**612. Phytohormones and Plant Growth Regulators. (3-0). Credit 3. I**

This course includes material on the classification, properties, and action of naturally occurring plant hormones as well as a discussion of the synthetic growth regulators. Material is included on practical application and uses of phytohormones and growth regulators. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1963-64 and in alternate years thereafter.)

**613. Plant Growth and Development. (3-0). Credit 3. I**

A course dealing with the growth, differentiation, and development of higher plants. A comprehensive study of vernalization and photoperiodism is included as well as a discussion of the influences of water relations, mineral nutrition, and hormones on the developmental cycle. Consideration is also given to differentiation within the plant as related to such qualities as winter hardiness and drought resistance. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**616. Methods in Plant Pathology. (2-6). Credit 4. II**

A presentation of the methods by which plant diseases are identified and investigated. Emphasis is placed on preparation for research work in plant pathology. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**617. Parasitism in Plant Disease. (3-3). Credit 4. I**

A critical presentation of the literature on the invasion of plant tissues by parasitic bacteria, fungi, and nematodes. Mechanisms of host defense are examined. Processes are illustrated in the laboratory through the study of histological preparations and by experimentation. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1963-64 and in alternate years thereafter.)

**618. Bacterial Plant Diseases. (2-3). Credit 3. II**

A detailed study of bacterial diseases of fruit and vegetable crops, field crops and ornamental plants, with special emphasis upon the nature of the disease, dissemination of the pathogen and methods of control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**620. Plant Viruses. (2-0). Credit 2. II**

Lecture presentation and discussion of the nature and properties of plant viruses. Methods of virus transmission, host plant reactions to viruses, serological reactions, and methods of purification of viruses for examination under the electron microscope, and the study of economically important plant virus diseases and their control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1963-64 and in alternate years thereafter.)

**621. Plant Parasitic Nematodes. (2-3). Credit 3. I**

The morphology, identification, and biology of plant parasitic nematodes; the damage they cause; methods of control. Non-plant-pathogenic nematodes commonly found in the soil will be studied also. Prerequisite: Approval of the instructor.

**622. Plant Nematology. (1-6). Credit 3. II**

Advanced study of the principal groups of plant parasitic nematodes, with emphasis on methods used in research. Prerequisite: Plant Physiology and Pathology 621. (Offered in 1964-65 and in alternate years thereafter.)

**623. Diseases of Field Crops. (2-3). Credit 3. I**

An intensive study of both the fundamental and the practical aspects of the more important and representative diseases of field crops. The plant disease problems peculiar to extensive cultivation methods will be stressed. Prerequisite: Plant Physiology and Pathology 301.

**624. Diseases of Fruits, Vegetables, and Ornamentals. (2-3). Credit 3. II**

Identification and control of the important diseases of fruit, vegetable, and ornamental crops in Texas. Consideration will also be given to diseases of major berry crops and pecans. Various diseases and types of decay affecting products in shipment and storage will be studied. Each student will be required to carry out an inoculation-isolation exercise employing a bacterial or fungus pathogen. A virus inoculation exercise will be done by students working in pairs. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1963-64 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Reports and discussions of topics of current interest in plant physiology and plant pathology, including reviews of literature on selected subjects.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or dissertation. Prerequisite: Plant Physiology and Pathology 314 or the equivalent (for physiology), 301 or the equivalent (for pathology).

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigations in support of thesis or dissertation.

## Department of Poultry Science

Professor J. H. Quisenberry,
Professors J. R. Couch, W. F. Krueger; Associate Professors T. M. Ferguson,
C. B. Ryan; Assistant Professors R. L. Atkinson, C. R. Creger,
R. C. Fanguy, F. A. Gardner

**201 Poultry Production. (2-2). Credit 3. I, II**

The breeds and types of poultry, culling poultry for egg production, incubation, brooding and feeding for growth and egg production, winter and summer management, housing and hygiene, preparing poultry for market, methods of marketing, practical application of these subjects to farm conditions. The practice consists of the identification of breeds and varieties, judging poultry for egg production, plans for poultry farms and poultry houses, identification of feeds, and formulation of poultry rations.

**303. Turkey Production. (2-0). Credit 2. II**

Varieties of turkeys; breeding practices; management and feeding; incubation practices; management of poults from hatching to market; special turkey marketing practices; sanitation and disease prevention with special reference to turkeys.

**308. Hatchery Management. (2-3). Credit 3. II**

Commercial hatching in America, early commercial hatcheries, expansion, types of hatchery enterprise, related activities, localization of hatchery business, how and where to start, hatchery building, inside arrangement, ventilation, heat and temperature control, hatchery equipment, types of incubators; hatchery flock improvement, study of the National Poultry and Turkey Improvement Plans, sanitation, incubation practices, prices and hatchery costs. Trends in size of hatcheries and causes. Practice consists of culling and blood testing hatchery flocks, setting eggs in incubator, fumigating and disinfecting incubator, candling hatching eggs, pedigreeing and judging baby chicks.

**309. Broiler Production. (2-2). Credit 3. I**

A study of modern commercial broiler production including type of birds required for successful broiler operation; the importance of such factors as body conformation, rate of growth, feathering, livability, uniformity, and feed efficiency; housing and equipment requirements for brooding, advantages of different brooding and management systems; disease hazards; a study of cost factors such as feed, chick, labor, medication, and overhead; methods of marketing broilers; methods of financing broiler operations; integration in the broiler industry. Practice involves the design, setting up and conducting broiler tests for evaluation of modern strains, feeds, and management practices. At the end of the tests the birds will be graded, dressed, and production costs calculated.

**401. Management and Selection. (1-2). Credit 2. II** †

How to select breeding males and females; culling the farm flock; planning a poultry program for a community with emphasis on good management and soundness of health; how to plan and manage county poultry shows. A thorough study of the National Poultry Improvement Plans, with enough practice work in selecting and testing to qualify students for official Plan participation.

**403. Judging. (2-2). Credit 3. I**

The judging of standard breeds and varieties; special instructions for judges; methods of fitting and showing birds; types of shows and show management; a study of standard disqualifications and their application to various selection standards; grading of live and dressed market poultry, and of market eggs. Practice work consists of judging classes for production and for market quality. Several small poultry shows will be judged, and visits made to egg and poultry processing plants and farms of poultry breeders.

**407. Technology and Marketing of Poultry and Poultry Products. (2-2). Credit 3. I**

A study of the U.S.D.A. grades of eggs, and of live and dressed poultry; preparing poultry for market—killing, dressing, chilling, and packaging; candling; grading, and packing shell eggs; drying and freezing eggs; storage problems and techniques with special emphasis on maintenance of quality during storage; planning poultry and egg plant layouts with special emphasis on meeting U.S.D.A. requirements for sanitation; a study of commercial egg and poultry plants and their operation; newer developments in packaging and merchandising poultry and eggs; effects of feed upon quality and quality retention; a careful study of regulations governing the grading and inspection of poultry of the U.S. Department of Agriculture, with special emphasis on inspection for wholesomeness.

**411. Poultry Feeding. (3-2). Credit 4. I** †

The history of poultry nutrition, a short study of the chemical composition of carbohydrates, proteins, fats, vitamins, and mineral mixtures as found in poultry feeds. Compositions, functions, sources, and care of vitamins commonly required for efficient poultry feeding. A study of the nutritive value of the different grains, roughages, mill feeds, and protein concentrates used in poultry nutrition. Practice work in the analysis of feedstuffs, the formulation of poultry rations, and diagnosis of lack of essentials in poultry rations. Prerequisites: Chemistry 223, 231.

**414. Poultry Breeding. (2-2). Credit 3. I** †

The basic principles of poultry breeding. The inheritance of characters of economic importance. The records essential for a sound breeding program; the selection of breeders on the basis of records and standardbred characteristics. Practice includes taking records on the breeding birds, interpreting the records, and the techniques involved in pedigree breeding. Prerequisite: Genetics 301.

**481. Poultry Seminar. (1-0). Credit 1. II**

Extensive review of the literature on poultry problems. The student will be required to prepare and present to the class comprehensive reviews of the literature on various phases of poultry science. Each student will be assigned a certain number of technical journals for current reporting to the seminar group. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

A directed study of a selected problem not covered by other courses in the Department of Poultry Science. The content of the course would be adapted to the interest and needs of the students. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**603. Principles and Practices of Incubation. (3-3). Credit 4. II**

A study of the developmental stages of the chick during incubation. Correlation of development with genetic and environmental factors. Study of the fundamental principles underlying successful artificial incubation of eggs. Relation of egg characters to hatchability. Effects of pre-incubation treatment on hatchability of chicken and turkey eggs. Control of disease during the incubation process. Relation of maternal diet to embryonic development and hatchability of the chick. Prerequisite: Poultry Science 308 or equivalent.

**604. Principles of Brooding and Rearing. (3-3). Credit 4. I**

A study of principles involved in brooding poultry. Relative cost and efficiency of different brooding and rearing methods. Relation of brooding practice to growth, livability, and subsequent adult performance. Such factors as diet, levels of protein, minerals, vitamins, medicants and growth stimulants are analyzed in relation to growth, livability, malformations, and feed efficiency. Physiological factors such as temperature control mechanisms and hormones are covered. Research methodology and thorough literature review are stressed. Prerequisites: Poultry Science 201 and 303 or equivalent.

**609. Avian Physiology. (3-3). Credit 4. I**

A study of basic physiological principles pertaining specifically to the avian species. The chicken will be used as the laboratory animal. The vascular, digestive, neural, respiratory and reproductive systems will be stressed. Prerequisites: Biology 433; approval of instructor.

**611. Poultry Processing, Storing, and Distribution. (3-0). Credit 3. II**

A study of egg quality and of egg quality maintenance. Effects of storage on egg and meat quality. The latest methods of processing eggs and poultry; feeding of market birds to improve grade; costs of production for various areas, and for various sized flocks and methods of management; planning optimum sized units for economical production. Prerequisites: Agricultural Economics 314 or equivalent; Poultry Science 407 or the equivalent.

**612. Laboratory Problems in Poultry Processing, Storing, and Distribution. (0-3). Credit 1. II**

A survey of improved methods of processing poultry and eggs. Certain selected modern processing plants will be visited and a study made of operating methods. Students may assist with experimental work in progress on poultry and egg processing and storage. Laboratory comparisons of various methods of fattening and their effects on market and storage quality of fowl. Effects of temperature and methods of dressing on market and storage quality. Prerequisite: Poultry Science 611 or registration therein.

**613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

An advanced and specialized study of poultry breeding and genetics covering such areas as causation, interrelations among traits, effective size of populations, methods of measuring genetic improvement, the heterosis concept, measures of general and specific combinability, and genetic homeostasis. Efficiency of various systems of breeding poultry will be analyzed. Scientific journals and technical literature will be reviewed. Prerequisites: Genetics 301 and Poultry Science 414 or the equivalent.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Intensive review and reporting of literature on poultry feeding, breeding, incubation, marketing, and management problems. Development of familiarity not only with literature but with organizations, agencies, and personnel working with poultry problems. Prerequisite: Graduate classification. May be repeated as many semesters as desired but maximum of two credits allowed toward Master's degree.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

An intensive study of newer principles and methods in the various specialized fields of poultry science—breeding, nutrition, market technology. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Intensive study of research methods and techniques in poultry breeding, nutrition, physiology, physical aspects of marketing, or poultry products technology. Students will be required to carry out some experimental projects in one of these fields. Reviews of specific literature, collection, analysis, and presentation of experimental data will be stressed. Designed for thesis and dissertation credit.

## Department of Range and Forestry

Professor C. L. Leinweber,
Professor O. E. Sperry; Associate Professors F. W. Gould, W. G. McCully,
R. R. Rhodes; Assistant Professor D. L. Huss

**102. Introduction to Range and Forestry. (1-0). Credit 1. II**

A brief survey of the fields of forestry and range management including the history, resources, policies, organization, industries, employment, education and research pertaining to the respective professions. One field trip into the forest is required.

**202. Range Plants. (2-3). Credit 3. I**

Native forage plants of the ranges of the United States. Determination, distribution, ecology, and economic value, especially in Texas, are considered. Poisonous plants and range practices to avoid livestock losses are included. Prerequisite: Biology 102 or the equivalent.

**203. Dendrology. (1-3). Credit 2. I**

The identification, classification, group silvical characteristics, distribution, and values of the important trees and shrubs of the coniferous groups (Gymnosperms). Field trips arranged. Prerequisite: Biology 102.

**204. Dendrology. (2-3). Credit 3. II**

The identification, classification, group silvical characteristics, distribution, and values of the important trees of the hardwood group (Angiosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Field trips arranged. Prerequisite: Biology 102.

**301. Plant and Range Ecology. (2-3). Credit 3. II** †

An analysis of habitat factors as they influence plant growth. Attention is given plant succession, competition and distribution of plants in relation to the environment. Prerequisite: Biology 102.

**303. Agrostology. (2-3). Credit 3. I** †

A fundamental study of grasses, especially those of economic importance in Texas. A study of the characteristics of the various genera and species of grasses, their identification, distribution, propagation, improvement, and management with particular reference to their use and value in Texas ranges and pastures. Prerequisite: Biology 102 or equivalent.

**304. Range Management. (2-3). Credit 3. I**

A technical course dealing with problems met in managing native range lands, including a study of grazing regions, and the problems of each; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock management as it affects vegetation. Field trips. Prerequisites: Range and Forestry 301, 303.

**308. Forest Management. (2-3). Credit 3. II**

A study of the principles and problems involved in the management of forest stands for multiple use of timber, forage, wildlife, and watershed protection; the application of tree and log measurements to the principal forest products; and the preservation of wood products for farm and ranch use. Field trips.

**309. Silvics and Silviculture. (2-3). Credit 3. I**

A study of the factors of site, their influence on tree growth and reciprocal effect on site; silvicultural cutting systems, cultural operations, and the silvicultural characteristics of the more important commercial species of the South and Southwest. Field trips. Prerequisite: Range and Forestry 308.

**401. Range Improvement and Maintenance. (2-3). Credit 3. I, II**

A general course for students not majoring in range management. Native forage and poisonous plants on the ranges of Texas. Evaluation and analysis of range lands, grazing systems, livestock handling problems, physiology of plant responses to grazing and range management, range condition classification. Field trips.

**409. Advanced Range Management. (2-3). Credit 3. II** †

A technical course dealing with the more advanced problems in managing native range lands. Special attention will be given to the study of the development of the range industry, cost of production, range land utilization, grazing systems, range trend, and condition classes. Field trips. Prerequisite: Range and Forestry 304.

**412. Range Management Practices. (2-3). Credit 3. I, II**

Livestock management as related to utilization of range lands; range and ranch management planning; evaluation and survey of forage resource; economic principles associated with range livestock management. Prerequisite: Range and Forestry 304 or 401.

**485. Range Problems. Credit 1 to 3 each semester. I, II, S** †

Individual study and research upon a selected range problem approved by instructor.

## FOR GRADUATES

**605. Range Research Methods. Credit 2. I**

A study of research methods in range management and related subjects. A review of scientific investigation in the field and analysis of results. Prerequisite: Graduate majors in range and forestry.

**606. Range Economics. (2-0). Credit 2. II**

Range management practices, land utilization, and ranch operation as they affect economics of livestock industry and the nation. Prerequisite: Graduate majors and minors in range and forestry.

**607. Vegetation Influences. (3-0). Credit 3. I**

Interrelationships between ecological factors and vegetation, influence of forest and range vegetation on watershed management and soil conservation. Prerequisite: Range and Forestry 301. (Offered in 1963-64 and in alternate years thereafter.)

**609. Plant and Range Ecology. (3-0). Credit 3. I**

A detailed study of plant communities, successions, and the effect of various degrees of utilization in vegetation types and edaphic factors. Prerequisite: Range and Forestry 301 or equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**610. Range Grasses and Grasslands. (2-3). Credit 3. II**

A study of range grasses as applied to utilization and sustained production. The ecological characteristics and geographical features of the native grasslands. Ecological principles as applied to range problems. Individual problems to be assigned. Prerequisites: Range and Forestry 301, 303; approval of Head of Department.

**611. Control of Noxious Range Plants. (3-0). Credit 3. II**

An advanced study of native and naturalized noxious and poisonous plants on Texas ranges that are detrimental to good management practices. Their distribution, reproduction, dissemination, and methods and practices of control will be stressed in relation to conservation and economic importance. Field trips to be arranged. (Offered in 1964-65 and in alternate years thereafter.)

**612. Range Management Practices, Policies, and Administration. (3-0). Credit 3. I**

Advanced studies dealing with technical range management problems, social and economic background of legislation, and policies developed in the acquisition and administration of national, state, and private range properties. Field trips to be arranged. Prerequisite: Range and Forestry 409 or equivalent. (Offered in 1963-64 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Current scientific work in range management and related subjects in American and foreign fields. Prerequisite: Majors and minors in range and forestry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed for investigations not included in the student's research for thesis or dissertation. Problems may be selected in applied ecology, range management, or forestry. Lectures, conferences, field work, reports. Prerequisite: Graduate majors or minors in range and forestry.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation. Prerequisite: Graduate major in range and forestry.

## Religious Education

(See page 94)

## Department of Soil and Crop Sciences

Professor W. O. Trogdon,
Professors H. T. Blackhurst, M. E. Bloodworth, F. R. Brison, M. S. Brown, L. C. Coffey, A. F. DeWerth, H. E. Hampton, E. C. Holt, G. W. Kunze, T. E. McAfee, R. C. Potts; Associate Professors E. E. Burns, F. L. Fisher, C. L. Godfrey, R. D. Staten, J. B. Storey, E. L. Whiteley; Assistant Professors J. E. Endrizzi, M. C. Fuqua, J. F. Mills, G. A. Niles, P. E. Pawlisch, J. D. Manring, J. D. Smith; Instructors L. E. Clark, H. C. Thompson, J. R. Justin

### AGRONOMY SECTION

**105. Fundamentals of Crop Production. (2-2). Credit 3. I, II**

Classification and distribution of farm crops; importance of good varieties and good seed; crop improvement; preparation of the seed bed; commercial fertilizers; manures and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies.

**301. Soil Science. (3-2). Credit 4. I, II, S**

A basic course in soil science which deals with the principles of soil chemistry, physics, microbiology, fertility, and pedology. Prerequisites: Chemistry 102 or 104; junior classification.

**304. Plant Breeding. (3-2). Credit 4. II** †

The improvement of crops by hybridization and selection. Special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated, and asexually reproduced plants. Prerequisite: Genetics 301. Offered in 1963-64 and in alternate years thereafter.)

**305. Seed Technology and Commercial Grading. (2-3). Credit 3. II**

A study of the important crop seeds with emphasis on harvesting, cleaning, and storage as they influence quality of planting seed. The grading of grain, cotton and hay according to Federal standards. Prerequisites: Agronomy 105; Biology 101.

**306. Grain and Fiber Crops. (3-2). Credit 4. I**

A study of the geographical distribution, classification, physiology, principles of production, and use of the grain and fiber crops. Prerequisites: Agronomy 105, 301; Biology 101.

**308. Forage Crops. (2-2). Credit 3. I, II**

The production, utilization, and identification of the major forage crop plants with emphasis on adapted species and varieties for the Southwest. Prerequisites: Agronomy 105, 301; Biology 101.

**310. Soil Morphology. (1-3). Credit 2. II**

Field study of the morphological features of the soil profile in relation to soil utilization and management. Soil development, classification, and mapping are also covered. Prerequisite: Agronomy 301.

**318. Soil Conservation. (3-3). Credit 4. I, II, S**

A course dealing with the importance of soil conservation from the standpoint of different soil types in the agricultural regions of Texas and the United States. Conservation methods are presented according to climatic regions, cropping systems, topographic locations, and other influencing factors. Field practice in the making of a map of a farm, its soil, and a plan of reorganization for soil conservation. Prerequisite: Agronomy 301.

**413. Soil and Crop Management. (3-0). Credit 3. II** †

A study of the special problems in the utilization and management of soils and crops under varying soil and climatic conditions. Independent work in solving current agronomic problems in different parts of the Southwest required. Prerequisites: Agronomy 301; senior classification.

**417. Pasture Management. (3-0). Credit 3. I** †

Adaptation and management of native and introduced pasture plants; their establishment, production, utilization, and maintenance in permanent and temporary pastures. Field trips are required. Prerequisite: Agronomy 301.

**422. Soil Conditions and Plant Growth. (3-4). Credit 4. II, S** †

The chemical, biological, and physical processes, activities, and conditions in soils as they influence plant growth. Prerequisites: Agronomy 301; approval of the instructor.

**426. Fertilizer Technology. (2-0). Credit 2. II**

A study of the problems of the manufacture, storage, and application of commercial fertilizers, including a limited number of required field trips to various types of fertilizer plants. Prerequisite: Agronomy 301.

**428. Turf Management. (2-2). Credit 3. II**

A study of the fundamental and special problems in the establishment, utilization, and management of turf grasses under varying use conditions. Field trips are required. Prerequisites: Agronomy 301; Plant Physiology and Pathology 301, 313.

**445. Soil Physics. (2-3). Credit 3. I** †

A study of the fundamentals of soil physics and their application to the solution of problems in crop production, irrigation, and engineering. Prerequisites: Nine hours of soils and physics, with a minimum of three hours of each (may include soil mechanics).

**481. Agronomy Seminar. (1-0). Credit 1. I, II**

The preparation and presentation by the students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit field or laboratory investigation or the study of subject matter not included in established courses. Prerequisites: Ten hours of junior and senior agronomy.

## FOR GRADUATES

**601. Grain and Cereal Crops. (3-0). Credit 3. II**

An advanced study of grain and cereal ecology, utilization, physiology and morphology, including a critical review of world literature reporting recent investigations in this field.

**602. Forage Crops. (3-0). Credit 3. I**

An advanced study of forage production, utilization, ecology, physiology, and morphology. Factors affecting initiation of regrowth and seed and forage quality. It includes a review of world literature reporting recent investigations in this field.

**605. Pedology. (3-0). Credit 3. I**

An advanced study of the development, morphology, constitution, and classification of soils.

**617. Advanced Soil Physics. (3-3). Credit 4. II**

The physical constitution and properties of soil, including consistence and structure, aeration, soil water, and thermal relationships. Prerequisites: Agronomy 445 or the equivalent and a two-semester course in physics. (Offered in 1964-65 and in alternate years thereafter.)

**618. Advanced Soil Analysis. (2-3). Credit 3. II**

A course designed to familiarize the student with the more difficult problems of soil analysis and the interpretation of the data. Prerequisite: Agronomy 422. (Offered in 1963-64 and in alternate years thereafter.)

**624. Physical Chemistry of Soils. (3-3). Credit 4. I**

The physical chemistry of clay minerals and the inorganic and organic soil colloids. Prerequisites: Agronomy 617, 618; Chemistry 323, 324. (Offered in 1964-65 and in alternate years thereafter.)

**626. Soil Mineralogy. (3-3). Credit 4. I**

A study of the crystal structures and properties of the more important agricultural and industrial clays combined with identification techniques involving X-rays, differential thermal analysis, and electron microscopy. (Offered in 1963-64 and in alternate years thereafter.)

**627. Soil Fertility Relationships. (2-0). Credit 2. II**

An advanced study of the concepts and approximations that have been used to describe the relationships between nutrient supplies and plant responses, and the techniques of applying this information in the solution of problems. Prerequisites: Agronomy 422 and Plant Physiology and Pathology 314, or registration therein. (Offered in 1964-65 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A seminar for graduate students and staff members in soils and crops. Presentation and discussion of special topics and research data in the field of agronomy. Participation is required of all graduate students in agronomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced problems in some phase of agronomy not directly related to the thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the thesis or dissertation.

**Genetics 612. Plant Genetics. (3-3). Credit 4. II**

See the Genetics Section of the Department of Plant Sciences for a full description of this course.

## FLORICULTURE SECTION

**206. Ornamental Plants. (2-2). Credit 3. I**

An introduction to the identification and appreciation of woody plants commonly grown in nurseries and used in landscape plantings. Prerequisite: Biology 101.

**207. Ornamental Plants. (2-2). Credit 3. II**

A continuation of Floriculture 206 emphasizing the identification and appreciation of woody and herbaceous ornamental plants and their use in landscape plantings. Prerequisite: Floriculture 206.

**319. Exotic Plants. (2-2). Credit 3. I**

A detailed study of the new, unusual, and rare ornamental plants, with emphasis on the exotic plants of the tropic and subtropic zones of the world including their identification, use, and adaptation to both outdoor and indoor landscape developments. Prerequisite: Floriculture 207.

**327. Principles of Floriculture. (2-2). Credit 3. II**

A study of the specialized management techniques and the application of scientific developments to the practices involved in the operation of modern nurseries, greenhouses, garden centers, flower shops, and other operations devoted to the production and marketing of ornamental plants.

**424. Propagation of Ornamental Plants. (2-2). Credit 3. II** †

A scientific study of plant propagation with special emphasis on the anatomical and physiological considerations involved and their importance to the highly technical procedures required in modern commercial propagation. Prerequisite: Plant Physiology and Pathology 313.

**425. Landscape Maintenance and Construction. (3-3). Credit 4. II**

The principles and practices involved in grading, drainage, and construction of landscaped areas including the preparation of specifications and cost estimating, soil preparation, planting and transplanting operations, control of plant pests, scientific pruning methods, and arboriculture. Prerequisite: Floriculture 207.

**429. Nursery and Greenhouse Crops. (3-3). Credit 4. I** †

The application of basic scientific developments to the principles and practices involved in the production, harvesting, grading, and distribution of crops grown in modern nurseries, greenhouses, and other forcing structures. Prerequisites: Floriculture 327; Plant Physiology and Pathology 313.

**432. Homesite Floriculture. (2-2). Credit 3. II, S**

The application of floriculture and landscape horticulture to modern living. A survey course open to all college students. The objectives of the course are to help future homeowners with an understanding of the landscape arrangement of the home grounds, their proper maintenance and development including the use of plants and flowers in the home. Not open to majors in floriculture. Prerequisite: Junior classification.

**485. Special Problems. Credit 1 to 4. I, II, S**

Special problems in floricultural production and marketing and in landscape horticulture. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**609. Taxonomy of Ornamental Plants. (2-2). Credit 3. I**

Specialized study of the genera, species, varieties, and clons of woody and herbaceous ornamental plants including identification, form, structure, and uses and their adaptability to the climatic conditions of the Southwest. Specific problems with these plants will be studied under field conditions. Emphasis on the taxonomy, physiology, and anatomy of these plants.

**610. Tropical Foliage Plants. (2-2). Credit 3. II**

An intensive study of the rare and exotic plants of tropical and subtropical regions of the world including the identification, adaptation, cultural requirements, propagation, and economic importance. Specific problems in taxonomy, physiology, and anatomy of these plants.

**615. Greenhouse Problem Diagnosis. (0-3). Credit 1. I**

Instruction in the diagnosis of routine problems encountered in the management and maintenance of greenhouse facilities and the problems involved in the propagation, care, and analysis of plants grown in greenhouses for scientific investigations. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or a dissertation. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## HORTICULTURE SECTION

**201. General Horticulture. (2-2). Credit 3. I, II**

A survey of the general field of horticulture; the growth and fruiting habits of horticultural plants; a study of the principles and practices of propagation, including seedage, cuttage, graftage, and special methods; a study of the planting, care, culture, harvesting, handling, and utilization of fruit and vegetable crops. Prerequisite: Biology 101.

**311. Processing Horticultural Crops. (2-3). Credit 3. I** †

A study of the principles and practices of canning, quick freezing, dehydration, pickling, and juice manufacture of fruits and vegetables. Fundamental concepts of the various techniques of preparation, processing, packaging, and use of additives will be given. Field trips to commercial processing plants will be made.

**319. Orchard Management. (2-2). Credit 3. II**

A study of rootstocks, varieties, sites, pruning, temperature, dormancy, soil management, nutrition, chemical fruit thinning, harvesting, storage, insects, and diseases of peaches, plums, and pears. A few other deciduous fruit plants are studied in lesser detail. Prerequisite: Horticulture 201. (Offered in 1964-65 and in alternate years thereafter.)

**322. Vegetable Crops Management. (2-3). Credit 3. I**

The principles of vegetable crop production will be covered. The factors of climate, soil, crop rotation, variety, plant growing, transplanting, planting, irrigation and drainage, weed control, insect and disease control, harvesting, marketing, storage, and special cultural practices will be considered. All of the major vegetable crops will be discussed with reference to these factors.

**418. Nut Culture. (1-3). Credit 2. II** †

Importance of nut crops, emphasis on pecan; problems of developing and maintaining pecan groves; developing native trees; study of varieties, fruit setting, soils, fertilizers, propagation methods, harvesting, handling, shelling, storage, and marketing the crop. Practice: Budding and grafting nursery stock, topworking native trees, storage and handling of budwood, examination of soils, spray application, visits to shelling plants.

**422. Citrus and Subtropical Fruits. (2-2). Credit 3. I** †

A study of the history, taxonomy, and factors limiting the distribution of citrus species. Planting, irrigation, soil management, pruning, factors influencing hardiness, packing, grades, post harvest physiology, and marketing of citrus will be studied. The scope of the industry, propagation, varieties, and orchard practices of the avocado, papaya, pineapple, banana, and other subtropical and tropical fruit plants are studied. (Offered in 1963-64 and in alternate years thereafter.)

**426. Commercial Propagation. (2-2). Credit 3. II** †

A study of principles and practices followed in the propagation of fruit trees. The course includes a study of graft union, congeniality between stocks and scions, adaptation of stocks to environment, and commercial propagation practices for important fruits. Practice includes special treatments for seeds, budding, grafting, and transplanting for important fruits.

**434. Grading and Packing Vegetables. (2-3). Credit 3. I** †

A consideration of the factors of good quality in market vegetables. Standard grades and packages. Shipping methods. The relation of production methods to quality. Transit losses. The methods of marketing open to the producer. Recent trends in marketing and packaging.

**444. Laboratory Examination of Processed Food. (1-3). Credit 2. II** †

Practice and theory in chemical, physical, microscopic, and microbiological methods of food analysis and interpretation of results. Federal and State regulations will be considered. Prerequisite: Approval of the instructor.

**446. Commercial Fruit and Vegetable Canning. (2-3). Credit 3. II** †

An advanced course in pilot plant and laboratory operations pertaining to the production of canned fruits and vegetables. Prerequisite: Horticulture 311.

**481. Seminar. (1-0). Credit 1 each semester. I, II** †

Review of current experimental work in the field of horticulture, presented by staff members, graduate and senior students. Required of all senior students in horticulture.

**485. Problems in Horticulture. Credit 1 to 4. I, II, S**

Special problems in fruit and vegetable crop production and processing. Prerequisite: Senior classification or approval of Head of Department.

## FOR GRADUATES

**601. Environmental Relations of Fruit Plants. (3-3). Credit 4. I**

Water, nutrition, and temperature relations of fruit plants will be studied. Practice will involve laboratory analyses of soil moisture relationships, leaf analyses by flame spectrophotometry, and a study of plant growth regulator control of dormancy. Basic principles will be applied to practical management problems. (Offered in 1964-65 and in alternate years thereafter.)

**602. Factors Influencing Fruit Production. (3-3). Credit 4. II**

The influence of pruning, light, plant growth regulators, and structural factors on fruit setting will be studied. Practice will include chromatographic separation, spectrophotometric identification, and biological assay of endogenous plant growth regulators. Pruning, chemical fruit thinning, and fruit plant hybridization experiments will be conducted. (Offered in 1963-64 and in alternate years thereafter.)

**603. Structure of Vegetable Plants. (3-3). Credit 4. II**

A consideration of the morphological and anatomical features of important families of vegetable plants and the relation of these features to growing practices and progressive improvements of the various plants.

**604. Physiology of Vegetable Plants. (3-3). Credit 4. I**

The topics of thermoperiodism, photoperiodism, nutrient deficiencies, water relations, temperature relations, fruit setting, growth, and seed germination will be taken up for each of the major vegetable crops. The recent developments in the use of hormones and selective herbicides in vegetable production will be discussed.

**681. Seminar. (1-0). Credit 1. I, II**

Intensive review and literature reporting on production and processing of horticultural crops. Development of familiarity with horticultural research literature, organizations, and personnel. Required of all graduate students in Horticulture.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A comprehensive review of fundamental principles in research and methods employed in research. Practice in the various techniques which may be used in different investigations of horticultural problems.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in horticultural problems for thesis or dissertation.

## Institute of Statistics

**406. Statistical Methods. (2-2). Credit 3. I, II, S** †

A non-mathematical introduction to the concepts of random sampling and statistical inference; estimation and testing hypotheses of means and variances; the analysis of variance; regression analysis; chi-square tests. Not to be used for graduate credit by Statistics majors. Prerequisite: Approval of the instructor.

### FOR GRADUATES

**605. Statistical Analysis. (3-3). Credit 4. I, II**

A review of estimation and testing hypotheses; analysis of variance and covariance; simple, multiple, and curvilinear regression; introduction to experimental design; introduction to non-parametric methods. Prerequisite: Approval of the instructor.

**606. Design of Experiments. (2-3). Credit 3. II**

The fundamental principles of the design and analysis of experiments; randomized blocks, Latin squares, split plots, factorial experiments; confounding; missing plot techniques. Prerequisite: Approval of the instructor.

**607. Sampling. (2-0). Credit 2. I**

The planning, execution, and analysis of sample surveys; sampling from finite populations; simple, stratified, multi-stage, and systematic sampling; ratio estimates. Prerequisite: Approval of the instructor.

**608. Least Squares and Regression Analysis. (3-0). Credit 3. II**

Regression analysis, simple, multiple, and curvilinear, orthogonal polynominals; analysis of non-orthogonal and incomplete experiments by least squares methods; computer methods for least squares problems. Prerequisite: Approval of the instructor.

**609. Order Statistics and Non-Parametric Methods. (3-0). Credit 3. II**

The use of order statistics and other distribution free statistics for estimation and testing hypotheses. Prerequisite: Approval of the instructor.

**611. Theory of Statistics. (4-0). Credit 4. I**

The concept of probability, probability distribution, moment generating functions and limit theorem; the theory of estimation and testing hypotheses. Prerequisite: Approval of the instructor.

## Structural Mechanics

**468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

Matrix algebra; basic structural principles; displacement analysis by the real-work, differential-equation, Castigliano's first theorem, and auxiliary-load methods. Analysis of statically indeterminate structures by the consistent-distortion method. Displacements of statically indeterminate structures. Treatment of beams, trusses, frames, and curved members. Prerequisite: Aerospace Engineering 304 or Civil Engineering 345.

**469. Analysis of Structures. (2-3). Credit 3. II** †

Displacement analysis by the moment-area, elastic-weights, conjugate-beam, virtual-work, and Williot-Mohr methods. Analysis of statically indeterminate structures by the three-moment theorem, least-work, elastic-center, column-analogy, slope-deflection, moment-distribution, and relaxation methods. Treatment of beams, trusses, frames, and curved members. Prerequisite: Structural Mechanics 468.

### FOR GRADUATES

**601. Theory of Elasticity. (4-0). Credit 4. I, S**

Study of the analysis of stress and strain in two and three dimensions, equilibrium and compatability equations, strain energy methods, torsion of noncircular sections, flexure, axially symmetric problems. Prerequisite: Mathematics 601 or registration therein.

**602. Structural Stability. (4-0). Credit 4. II**

Primary buckling of centrally or eccentrically loaded columns; primary buckling of centrally loaded columns by torsion; built-up columns; lateral buckling of beams; buckling of rings. Prerequisites: Mathematics 308; approval of the instructor.

**603. Theory of Plates and Shells. (4-0). Credit 4. I**

Small-deflection thin plate theory for plates of various shapes and support conditions; bending of anisotropic plates; plates under combined lateral loads and in-plane forces; large-deflection thin plate theory; theory of shells; stability of plates and shells. Prerequisite: Mathematics 601 or registration therein.

**604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

A unified study of continuous media using vectors and tensors.

**605. Flow and Fracture of Solids. (4-0). Credit 4. II**

Study of deformation of solids; elastic, very viscous, and ideally plastic substances. Prerequisite: Structural Mechanics 601.

**606. Theory of Thermal Stresses. (4-0). Credit 4. II**

A basic study of heat conduction, thermoelasticity, and thermoinelasticity as related to thermal stresses. Prerequisites: Structural Mechanics 601; approval of the instructor.

**607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

A unified treatment of two- and three-dimensional frames by specialized matrix methods. Prerequisite: Structural Mechanics 468.

**608. Experimental Structural Analysis. (2-3). Credit 3. II, S**

Study of observations and measurements, dimensional analysis, prediction equations, and theory of similitude; design, construction, and use of structural models. Prerequisite: Structural Mechanics 468.

**609. History of Structural Mechanics. (2-0). Credit 2. II, S**

A study of the history of the development of structural mechanics to the present time. Prerequisite: Approval of the instructor.

## Department of Veterinary Anatomy

Professor J. H. Milliff;
Associate Professors L. W. Gibbs, A. G. Kemler; Instructor R. G. Greeley

**202. Veterinary Anatomy. (1-6). Credit 3. II**

Osteology of the horse and cow. Topographical dissection of the cow. Histology of the tissues and organs of the cow. Prerequisite: Biology 107 or the equivalent.

**301. Anatomy. (0-9).* Credit 3.* I** ‡

The osteology, dentition, and arthrology of the domestic animals and topographical dissection of the dog.

**302. Anatomy. (0-9).* Credit 3.* II** ‡

Topographical dissection of the cow and the comparative study of the horse, cat, and pig. Prerequisite: Veterinary Anatomy 301.

**303. Histology. (2-6). Credit 4. I** ‡

A microscopic study of the basic tissues and of the organs, excluding the organs of reproduction.

**304. Embryology. (3-3). Credit 4. II** ‡

A microscopic study of the reproductive organs of the domestic animals, and of serial sections of chick and pig embryos. Prerequisites: Veterinary Anatomy 301, 303.

**306.** Neuroanatomy. (0-6). Credit 2. II** ‡

The gross and microscopic anatomy of the nervous systems of the domestic animals. Prerequisite: Veterinary Anatomy 303.

**501. Applied Anatomy. (0-6).*** Credit 2.*** I, III** †

The anatomy of the areas of surgical and clinical importance in the domestic animals. Prerequisite: Veterinary Anatomy 302.

### FOR GRADUATES

**601. Veterinary Anatomy. (1-9). Credit 4 each semester. I, II**

The topographical dissection of domestic animals. Prerequisites: Veterinary Anatomy 301, 302.

**602. Veterinary Anatomy. (2-6). Credit 4. I, II**

The microscopic structure of the anatomical systems of domestic animals. Prerequisite: Veterinary Anatomy 303.

**603. Neuroanatomy. (2-6). Credit 4. II**

The study of the gross, developmental, and microscopic anatomy of the nervous systems of the domestic animals. Prerequisite: Veterinary Anatomy 306.

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*Become (1-9), credit 4, September 1964.

**Becomes 406 effective September 1964.

***Becomes (1-6), credit 3, September 1964.

‡May be taken for graduate credit by students not majoring in veterinary medicine

**604. History of Anatomy. (1-0). Credit 1. I, II, S**

A discussion of the biographies and contributions to the field of anatomy of the most important anatomists from 500 B.C. to the present. Prerequisite: Graduate major in veterinary anatomy.

**681. Seminar. (1-0). Credit 1. S**

The review and discussion of current scientific work in anatomy and related subjects. Prerequisite: Graduate major or minor in veterinary anatomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Problems in either gross or microscopic anatomy along lines to be chosen by the individual. Prerequisites: Veterinary Anatomy 306; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on a selected thesis problem in anatomy. Prerequisite: Graduate major in veterinary anatomy.

## Veterinary Clinics

**501. Clinics. (0-24). Credit 8. I**

Groups will participate on a rotating schedule in the various areas: (1) Large animal clinics, (2) small animal clinics, (3) ambulatory clinics, (4) clinical laboratory and radiology, (5) poultry diagnosis, (6) applied pathology, (7) clinical parasitology, (8) food hygiene and public health, (9) field duty. Prerequisite: Veterinary Medicine and Surgery 573.

**502. Clinics. (0-30). Credit 10. II**

Continuation of Veterinary Clinics 501. Prerequisite: Veterinary Clinics 501.

**503. Clinics. (0-33). Credit 11. III**

Continuation of Veterinary Clinics 502. Prerequisite: Veterinary Clinics 502.

## Department of Veterinary Medicine and Surgery

Professor M. R. Calliham,
Professors W. C. Banks, H. E. Redmond; Associate Professors E. W. Ellett, J. C. Ramge, W. M. Romane; Assistant Professors J. H. Denton, W. D. Evers, G. M. Gowing*, C. K. Jones, J. E. Morrison, D. L. Piermattei, R. S. Titus, M. F. Young; Instructor J. C. Hensley, II; Lecturer A. A. Price

**311. History of the Veterinary Profession. (1-0). Credit 1. I**

The history of the development of veterinary art and science, veterinary education, veterinary societies and regulatory agencies, and professional veterinary medicine.

**416. General Surgery. (1-0). Credit 1. II**

Principles of unsoundness and horseshoeing. Prerequisite: Veterinary Anatomy 302.

**511. Non-Infectious Diseases of Large Animals. (3-0). Credit 3. I**

Lectures and demonstrations on physical diagnosis; diseases of the digestive, circulatory, respiratory, urinary organs; nervous system; and the skin of large animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**512.** Radiology. (2-0). Credit 2. II**

The course provides the student with a foundation of veterinary radiology. It includes physical properties and production of ionizing radiation, roentgenographic and darkroom procedures, hazards and protection from excessive radiation, and basic principles and uses of radiation as a therapeutic agent. Prerequisite: Veterinary Pathology 443.

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*On leave of absence from 9-1-62 to 8-31-63.

**Becomes 412 September, 1964.

**513. Non-Infectious Diseases of Small Animals. (3-0). Credit 3. I**

Non-infectious and nutritional diseases, obstetrics, pediatrics, and geriatrics of small animals, fur-bearing animals, and laboratory animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**514. Infectious Diseases of Small Animals. (2-0). Credit 2. II**

A study of the bacterial, rickettsial, viral, and protozoan diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 513.

**515. General Surgery. (4-0). Credit 4. I**

The principles of dentistry, surgery, and anesthesia of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Medicine and Surgery 416.

**516. Operative Surgery of Large Animals. (2-2). Credit 3. II**

Surgical diseases and special surgery of large animals. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**519. Clinics. (0-4). Credit 1. I**

Clinical orientation, restraint, administration of medicine, physical examination, methods of collecting specimens for laboratory purposes. Prerequisites: Veterinary Medicine and Surgery 513 and 515 or registration therein.

**520. Clinical Seminar. (0-4). Credit 1. II**

Presentation and discussion of clinical cases. Prerequisite: Veterinary Medicine and Surgery 519.

**521. Reproductive Diseases. (2-0). Credit 2. II**

A consideration of prevention and treatment of diseases incident to or affecting breeding, conception, gestation, parturition, and postparturient convalescence of common domestic animals; prevention and treatment of diseases of the newborn. Prerequisite: Veterinary Medicine and Surgery 526.

**524. Operative Surgery of Small Animals. (1-2). Credit 2. II**

Surgical procedures in small animals, including orthopedics. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**526. Obstetrics. (2-0). Credit 2. I**

Castration and spaying of farm animals, physiology of parturition, mechanics of obstetrical operations; theory and technique of artificial insemination. Prerequisite: Veterinary Physiology and Pharmacology 529 or registration therein.

**561. Clinical Laboratory Diagnosis. (0-2). Credit 1. I** †

Instruction in clinical laboratory procedures including hematology, urine analysis, radiography, and radiation therapy. Prerequisites: Veterinary Medicine and Surgery 520; Veterinary Microbiology 436.

**562. Clinical Laboratory Diagnosis. (0-2). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 561. Prerequisite: Veterinary Medicine and Surgery 561.

**563. Ambulatory Clinic. (0-4). Credit 1. I**

Under the supervision of an instructor, students are taken on calls to private farms or College herds for training and experience in the diagnosis and treatment of animal diseases under actual farm and ranch conditions. Prerequisite: Veterinary Medicine and Surgery 520.

**564. Ambulatory Clinic. (0-4). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 563. Prerequisite: Veterinary Medicine and Surgery 563.

**565. Large Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. All species of large animals are utilized. Lectures on hospital management and large animal practice and promotion are included. Prerequisite: Veterinary Medicine and Surgery 520.

**566. Large Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 565. Prerequisite: Veterinary Medicine and Surgery 565.

**567. Small Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. Detailed studies of hospital planning, practice management, and promotion and veterinary ethics are included. Prerequisite: Veterinary Medicine and Surgery 520.

**568. Small Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 567. Prerequisite: Veterinary Medicine and Surgery 567.

**570. General Surgery. (2-3). Credit 3. II**

The principles of anesthesia, surgery, and dentistry of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 430.

**571. Diseases of Small Animals. (5-0). Credit 5. II**

A study of the infectious and non-infectious diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 412.

**572. Clinical Medicine. (0-3). Credit 1. II**

Clinical practices, restraint of animals, and diagnostic procedures. Prerequisite: Veterinary Medicine and Surgery 412.

**573. Obstetrics and Reproductive Diseases. (3-3). Credit 4. III**

Genital and reproductive diseases including prevention, diagnosis, and treatment; pregnancy diagnosis, obstetrics, and diseases of the newborn. Prerequisite: Veterinary Physiology and Pharmacology 429.

**574. Diseases of Large Animals. (5-0). Credit 5. III**

The etiology, diagnosis, prognosis, treatment, and prevention of infectious and non-infectious diseases common to all farm animals and those specific to horses and swine. Prerequisites: Veterinary Medicine and Surgery 412; Veterinary Pathology 549.

**575. Operative Surgery. (2-4). Credit 3. III**

Correction of diseases by surgery. The application of art and science in surgical principles and techniques. Prerequisite: Veterinary Medicine and Surgery 570.

**576. Clinical Medicine. (0-3). Credit 1. III**

Application of the arts of clinical medicine. Prerequisite: Veterinary Medicine and Surgery 572.

**577. Diseases of Large Animals. (3-0). Credit 3. I**

The etiology, diagnosis, prognosis, treatment, and prevention of infectious and non-infectious diseases of ruminant animals. Prerequisite: Veterinary Medicine and Surgery 574.

**578. Laboratory and Domestic Animal Health Management. (4-0). Credit 4. II**

Environmental conditions necessary for the health of laboratory animals, poultry, small animals, and livestock. Prophylactic practices in nutrition, sanitation, and disease control. Prerequisites: Animal Husbandry 320; Veterinary Medicine and Surgery 574.

**579. Practice Management. (2-0). Credit 2. III**

Business principles, management practices, economic factors, and ethics of veterinary medical practice. Prerequisite: Veterinary Clinics 502.

**581. Clinical Seminar. (1-0). Credit 1. II**

Various aspects of special or complicated diseases will be presented by a panel from the staff of the School of Veterinary Medicine. The students will participate with the staff in discussions of the case and material. The presentations and discussions will be based primarily on cases submitted to the Veterinary Hospital. Prerequisite: Veterinary Clinics 501.

**582. Clinical Seminar. (1-0). Credit 1. III**

A continuation of Veterinary Medicine and Surgery 581. Prerequisite: Veterinary Clinics 502.

### FOR GRADUATES

**603. Veterinary Surgery. Credit 1 to 8 each semester. I, II**

Special surgery of large or small animals. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**612. Diagnostic Radiology. Credit 2 or 3 each semester. I, II, S**

Radiographic interpretation of large and small animals with special emphasis on film reading. The use of special techniques including contrast media as diagnostic aids will be discussed and demonstrated. Prerequisite: Degree of Doctor of Veterinary Medicine.

**685. Problems. Credit 1 to 8 each semester. I, II**

Original investigations of problems in the field of surgery, therapeutics, or radiology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis.

## Department of Veterinary Microbiology

Professor L. C. Grumbles;
Associate Professors A. I. Flowers, C. F. Hall, P. F. Jungerman, R. W. Moore

**301. Microorganisms in Animal Diseases. (1-4). Credit 2. I**

A study of the function of microorganisms in maintaining health and causing diseases in domestic animals. Rumen microflora. Preservation and spoilage of meat. Methods by which infectious diseases are transmitted and prevented. A study of selected groups of pathogens and specific diseases. Prerequisite: Biology 206.

**334. Poultry Diseases. (2-2). Credit 3. II**

Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic, and contagious diseases. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323.

**435.* Microbiology. (3-4).** Credit 4.** I** ‡

The principles of bacteriology, infection, and immunity. The morphology, physiology, antigenic structure, and identifying characteristics of bacteria are studied in detail. Consideration is given to the production of antibiotics and biologicals. The mechanism of infections and the fundamentals of immunity are studied and correlated. Prerequisite: Second year or trimester classification in veterinary medicine.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.
*Becomes 335 September 1964.
**Becomes (3-5), credit 5, September 1964.

**436. Microbiology. (3-3).* Credit 4.* II** ‡

A comprehensive study of the pathogenic microorganisms and their role in causing disease. Special emphasis is given to antigenicity and the relation of each organism to the immune phenomena. Laboratory diagnosis and species identification are stressed. Prerequisite: Veterinary Microbiology 435.

**438. Virology and Serology. (2-3). Credit 3. I**

A detailed study of the nature of viruses and Rickettsiae including their propagation, isolation, and identification. The reaction between the virus and the host cell. The theories, principles, and use of serologic procedures for identifying infectious agents, making a diagnosis, and measuring antibody response. Prerequisite: Veterinary Microbiology 436.

**485. Problems. Credit 1 to 3. I, II, S**

A directed, individual study of a selected problem in veterinary microbiology approved by the instructor. Prerequisite: Approval of the Head of the Department.

**595. Poultry Diseases. (2-2).** Credit 3.** I**

A study of avian diseases with emphasis on those of greatest economic importance. Prerequisite: Veterinary Microbiology 438.

**596. Poultry Diagnosis. (0-2). Credit 1. II**

Clinical laboratory diagnosis of poultry diseases. Prerequisite: Veterinary Microbiology 595.

## FOR GRADUATES

**643. Veterinary Microbiology. (3-4). Credit 4. I, II**

A study of the pathogenic microorganisms; their cultural and biological characteristics and pathogenicity.

**646. Avian Virus Diseases. Credit 1 to 4. I, II**

A study of the viral diseases of poultry including methods of isolation and identification of the causative agents. Practice consists of conducting post mortem examinations and special diagnostic procedures on birds received daily for necropsy. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**647. Veterinary Virology. Credit 1 to 4. I, II**

A detailed study of virus infections in animals, including types of infections, mode of transmission, intracellular pathology, epidemiology, isolation and identification of the inciting agents. Practice includes tissue cultivation, animal inoculations, and diagnostic tests. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Veterinary Mycology. Credit 1 to 4. II, S**

A study of the actinomycetes, yeasts, and molds that are pathogenic to man and animals; the morphology, cultural characteristics, pathogenicity and identification. Practice consists of exercises in cultural methods, morphological characteristics, biochemical reactions and diagnosis. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in microbiology. Prerequisite: Degree of Doctor of Veterinary Medicine. (May be taken for undergraduate credit with permission of the Head of the Department.)

**691. Research. Credit 1 to 8. I, II**

An original problem in veterinary microbiology. This research to be reported by a thesis as partial requirement for the Master of Science degree. Prerequisite: Admission to candidacy for Master of Science degree.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

*Becomes (3-5), credit 5, September 1964.

**Becomes (2-0), credit 2, September 1964.

## Department of Veterinary Parasitology

Professor R. D. Turk;
Associate Professor R. R. Bell; Assistant Professor T. J. Galvin

**483. Parasites of Domestic Animals.* (2-2). Credit 3. I** ‡

A study of the more important and commonly-occurring parasites and parasitic diseases of domestic animals. Practice consists of laboratory and diagnostic methods used in parasitology, utilizing fresh and preserved material obtained from the field, clinics, and necropsies. Signs, diagnosis, treatment, and control of parasitic diseases are emphasized. Prerequisites: Veterinary Anatomy 302.

**484. Parasites of Domestic Animals.* (2-2). Credit 3. II**

A study of the more important and commonly-occurring parasites and parasitic diseases of domestic animals. Helminth, protozoan, and arthropod parasites and diseases are considered. Signs, diagnosis, treatment, and control are emphasized. Prerequisite: Veterinary Parasitology 483.

**487. Parasites of Farm Animals and Poultry. (2-2). Credit 3. II, S** †

A study of some of the more important internal and external parasites of domestic animals and poultry. The life cycles, pathogenicity, and economic and public health aspects will be stressed with suggested methods for control. Open to agricultural students. Prerequisite: Senior classification.

**583. Clinical Parasitology. (0-2). Credit 1. I**

Diagnosis of parasitic diseases is emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Prerequisite: Veterinary Parasitology 484.

**584. Clinical Parasitology. (0-2). Credit 1. II**

Diagnosis of parasitic diseases including physical examination of patients and such laboratory procedures as are indicated. Prerequisite: Veterinary Medicine and Surgery 519.

**Veterinary Clinics 501. Clinics. (0-24). Credit 8. I**

See Veterinary Clinics for a full description of this course.

**Veterinary Clinics 502. Clinics. (0-30). Credit 10. II**

See Veterinary Clinics for a full description of this course.

**Veterinary Clinics 503. Clinics. (0-33). Credit 11. III**

See Veterinary Clinics for a full description of this course.

### FOR GRADUATES

**601. Parasitology. Credit 1 to 4 each semester. I**

A detailed study of the more important helminth parasites of domestic animals, including their identification, distribution, and life history. Prerequisite: Veterinary Parasitology 584 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Special problems concerned with the parasites of domestic animals or poultry. Prerequisites: Veterinary Parasitology 601 or the equivalent; approval of the instructor.

**691. Research Credit 1 or more each semester. I, II, S**

Research for thesis.

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*Becomes Parasitology September 1964.

‡May be taken for graduate credit by students not majoring in veterinary medicine.

## Department of Veterinary Pathology

Professor C. H. Bridges;
Associate Professors J. N. Beasley*, J. B. Henson, D. O. N. Taylor;
Assistant Professors F. A. Fear, W. F. Mestanza, K. R. Pierce;
Instructor R. M. Robinson

**443. General Pathology. (3-3).** Credit 4.** I**

The elementary disease processes and their causes, including a study of the gross and minute appearance of the diseased tissue. Such processes as inflammation, necrosis, gangrene, atrophy, hypertrophy, ulceration, the various degenerations, infiltrations, pigmentations, and tumor formations are considered. Practice consists of the microscopic study of these processes and instruction in laboratory technique. Prerequisites: Veterinary Anatomy 302, 304.

**444. Special Pathology. (5-3).** Credit 6.** II**

Lectures on special pathology of organs and systems. Infectious and non-infectious diseases are considered. The mechanism of development of lesions and their relationship to clinical symptoms are emphasized. Lectures are illustrated liberally with color slides. Laboratory work consists of studies in gross and microscopic pathology. Prerequisite: Veterinary Pathology 443.

**447. General Principles of Pathology. (2-2). Credit 3. I, S** †

A study of the mechanisms of disease as encountered in the higher mammalian species. The course deals with the causes and pathogenesis of the various types of disease, the reactions of the body against them, and certain abstract principles governing their treatment. Open to non-medical students. Lectures and demonstrations. Prerequisites: Six hours of biological sciences; junior classification.

**548. Nutritional and Metabolic Diseases. (3-0). Credit 3. II**

The clinical manifestations, pathologic physiology, pathologic morphology, and the causative mechanisms involved in the various nutritional and metabolic diseases of animals are considered. Prerequisites: Biochemistry and Nutrition 312; Veterinary Pathology 444; Veterinary Physiology and Pharmacology 427.

**549. Clinical Pathology. (2-0). Credit 2. I**

Interpretation of qualitative and quantitative changes in body fluids, secretions, excretions, and exudates in diagnosis of disease. Prerequisites: Biochemistry and Nutrition 312; Veterinary Pathology 444.

**577. Applied Pathology. (0-2). Credit 1. I**

Pathology as directly applied to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**578. Applied Pathology. (0-2). Credit 1. II**

Pathology as applied directly to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**585. Problems in Pathology. Credit 1 to 4 each semester. I, II, S**

An elective course for undergraduates who wish to supplement the standard required courses. Problems can be assigned in gross or microscopic pathology or in pathological technique. Prerequisites: Veterinary Pathology 443; approval of the instructor.

**Veterinary Clinics 501. Clinics. (0-24). Credit 8. I**

See Veterinary Clinics for a full description of this course.

**Veterinary Clinics 502. Clinics. (0-30). Credit 10. II**

See Veterinary Clinics for a full description of this course.

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*On leave of absence from 9-1-62 to 8-31-63.
**Becomes (4-3), credit 5, September 1964.

**Veterinary Clinics 503. Clinics. (0-33). Credit 11. III**
See Veterinary Clinics for a full description of this course.

## FOR GRADUATES

**643. Gross Pathology. Credit 1 to 6. I, II, S**
The student studies gross pathological changes at the necropsies performed daily. He then follows selected tissues through suitable histopathological techniques and corrects his gross diagnoses in the light of the microscopic findings. Confirmatory bacteriologic methods are utilized where indicated. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**644. Locomotor and Skeletal Diseases. Credit 1 or 2. I, S**
The changes taking place in diseased bones, joints, and muscles are studied with respect to their nature and probable causes, and with special reference to lameness of the horse. Frequent use is made of the unsurpassed Mark Francis Collection of Bone and Joint Pathology. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**645. Neoplastic Diseases. Credit 1 to 8. I, II, S**
Theoretical, histopathological, and clinical aspects of neoplasms. Diagnosis of neoplastic and related conditions in all species. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**646. Nutritional Diseases. Credit 2 to 4. II**
Gross and microscopic tissue changes to be found in experimentally produced nutritional deficiencies are considered in comparison with clinically encountered deficiencies and with other conditions from which they must be differentiated. Prerequisite: Degree of Doctor of Veterinary Medicine or other suitable preparation.

**647. Metabolic Diseases. Credit 1 or 2. S**
The pathology of diseases due to major disorders of metabolism, nonnutritional and non-infectious. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Reproductive Diseases. Credit 1 to 4. S**
Theoretical and practical pathology of gross and microscopic lesions in the reproductive organs with especial reference to bovine sterility. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**649. Gross Post-Mortem Diagnosis. Credit 1 to 6. I, II, S**
Advanced training in recognition, interpretation, and description of tissue changes encountered. Specific diagnoses are derived and defended. Prerequisites: At least 4 semester hours of credit in Veterinary Pathology 643.

**650. Neuropathology of Animals. Credit 1 to 4. I, S**
In addition to the study and interpretation of gross and microscopic lesions of the central and peripheral nervous systems, major attention is given in theory and in practice to the special laboratory techniques necessary to demonstrate such lesions. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**651. Microscopic Diagnosis. Credit 1 to 6. I, II, S**
Advanced training in diagnosis, applied especially to the "problem" cases currently encountered in the Department's pathological diagnostic service. Routine and special histopathological methods are employed. Prerequisites: A total of at least 10 semester hours of credit in Veterinary Pathology 643, 645.

**658. Pathological Technique. Credit 1 to 6. I, II, S**
The art and science of preparing animal tissues, fluids, and exudates for microscopic or other special examination. Enrollment is limited to the number who can be accommodated in the routine of the departmental laboratory. Prerequisite: A fair knowledge of general chemistry.

**659. Sheep Diseases. Credit 1 to 4. I**

The pathology, etiology, and symptomatology of the economically important diseases affecting sheep in all of the major sheep-producing countries of the world. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**691. Research. Credit 1 or more each semester. I, II, S**

Research to be reported by the writing of a thesis or dissertation as a partial requirement for the Master of Science or Doctor of Philosophy degree.

## Department of Veterinary Physiology and Pharmacology

Professor P. W. Burns;
Associate Professor R. H. Davis, Jr.; Assistant Professors S. E. Glass,
J. D. McCrady*, Michael Szabuniewicz

**323. Physiology of Farm Animals. (2-2). Credit 3. II**

A consideration of physiology essential to an understanding of diseases of farm animals. For students in agriculture. Prerequisites: Chemistry 228 or 231; Veterinary Anatomy 202.

**326. Physiology. (3-3). Credit 4. II** ‡

Introduction to physiology, physicochemical basis of cellular physiology, dynamics of nerve and muscle, functions of the circulatory system. Prerequisites: Biochemistry and Nutrition 312; Veterinary Anatomy 301, 303, and registration in 302 and 304.

**427. Physiology. (2-3).** Credit 3.** I** ‡

Functions of the respiratory system, renal function and acid-base balance, mechanisms of digestion, absorption and excretion, metabolism and energy exchange, minerals and vitamins, neurophysiology. Prerequisite: Veterinary Physiology and Pharmacology 326.

**428. ***Pharmacology. (3-0).** Credit 3.** I, II**

Pharmacologic principles; central nervous system depressants and stimulants; local anesthetics; autonomic drugs; skeletal muscle relaxants; antihistaminics. Practice consists of the study of the action of drugs on experimental animals. Prerequisites: Veterinary Physiology and Pharmacology 427, registration in 429.

**429. Endocrinology. (2-3). Credit 3. I**

Introduction to endocrinology, physiology and biochemistry of endocrine secretions, reproductive processes of domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 427.

**529. Pharmacology. (2-3).** Credit 3.** I, II**

Agents affecting blood formation and coagulation; cardio-vascular drugs; locally-acting drugs; expectorants and antitussives; gastrointestinal agents; water, ions, and nutrients, blood derivatives and plasma substitutes; diuretics; local and systemic anti-infectives; parasiticides; hormones; uterine stimulants and sedatives. Practice consists of exercises in pharmacodynamics, bio-assay, metrology, pharmaceutical arithmetic, compounding and dispensing. Prerequisite: Veterinary Physiology and Pharmacology 428.

**530. Toxicology. (2-2).**** Credit 3.**** I, II**

Occurrence, signs, symptoms, lesions, treatments; prevention and management of inorganic and organic poisonings. Clinical manifestations, lesions and management of animals affected by poisonous plants. Practice consists of observing response of animals to poisons; therapy; chemical detection of common poisons. Prerequisites: Veterinary Physiology and Pharmacology 428, registration in 529.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.
*On leave of absence from 6-1-62 to 5-31-63.
**Becomes (3-3), credit 4, September 1964.
***Becomes Veterinary Physiology and Pharmacology 430, September 1964.
****Becomes (3-2), credit 4, September 1964.

**573. Pharmacy. (0-2). Credit 1. I, II**

Principles of pharmacy; preparing, compounding, and dispensing medicines. Prerequisite: Veterinary Physiology and Pharmacology 529.

**574. Pharmacy. (0-2). Credit 1. II**

A continuation of Veterinary Physiology and Pharmacology 573. Prerequisite: Veterinary Physiology and Pharmacology 573.

**585. Problems in Physiology. (0-3). Credit 1. I, II, III**

A course for undergraduate students who desire additional laboratory work in physiology to supplement the required courses. Prerequisites: Veterinary Physiology and Pharmacology 427; approval of the Head of the Department.

### FOR GRADUATES

**601, 602. Animal Physiology. (3-3). Credit 4 each semester. I, II**

Recent phases of physiology; modern experimental methods. The work is arranged to suit the needs of the student and in harmony with his previous training. Prerequisite: Basic courses in morphology and organic chemistry.

**605, 606. Veterinary Toxicology. (3-3). Credit 4 each semester. I, II**

Original investigations and detailed studies of poisons or poisonous plants and their effects on domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 530.

**607, 608. Veterinary Pharmacology. (3-3). Credit 4 each semester. I, II**

Modern methods of research in pharmacology and pharmaceutical processes. Original research in studying the actions and uses of drugs. Prerequisites: Veterinary Physiology and Pharmacology 428, 529.

**611, 612. Veterinary Physiology. (3-3). Credit 4 each semester. I, II**

A detailed study of specific phases of physiology of domestic animals. Prerequisites: Veterinary Anatomy 303, 304; Veterinary Physiology and Pharmacology 427.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems in physiology, pharmacology, or toxicology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Original investigations in veterinary physiology, pharmacology, or toxicology to be submitted by writing of a thesis as partial fulfillment for the Master of Science degree. Prerequisite: Approval of Head of Department.

## Department of Veterinary Public Health

Professor F. J. Jaggi, Jr.;
Assistant Professor L. H. Russell, Jr.

**491. Animal Hygiene. (2-2). Credit 3. I, II**

This course deals with livestock sanitation and the prevention, control, and eradication of diseases of farm and ranch animals. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323; senior classification in agriculture.

**533.* Food Hygiene. (1-2).** Credit 2.** I**

The study of the dairy industry as it is related to public health and the practice of veterinary medicine. Quality tests, sanitation, and legal control methods are studied. Prerequisites: Veterinary Microbiology 436; Veterinary Pathology 444.

**536. Infectious Diseases of Large Animals. (5-0). Credit 5. II**

A study of the bacterial, rickettsial, viral, and protozoal diseases of farm and ranch animals (bovine, equine, ovine, caprine, and porcine). Public health aspects of the various intertransmissible diseases of animal and man are stressed. Prerequisite: Junior classification in veterinary medicine.

**591. Food Hygiene. (2-2).*** Credit 3.*** I**

A study of hygienic methods, regulations, and inspection procedures governing processing of foods of animal origin. Prerequisite: Veterinary Public Health 533.

**592.**** Public Health. (2-2).*** Credit 3.*** II**

Public health organization, administration, and methods of disease investigation and control with special emphasis on veterinary public health. Prerequisite: Veterinary Public Health 594.

**594. Principles of Epidemiology. (3-0). Credit 3. II**

Basic principles and methods of epidemiology with application to the zooanthroponotic diseases. Prerequisite: Veterinary Public Health 591.

**Veterinary Clinics 501. Clinics. (0-24). Credit 8. I**

See Veterinary Clinics for a full description of this course.

**Veterinary Clinics 502. Clinics. (0-30). Credit 10. II**

See Veterinary Clinics for a full description of this course.

**Veterinary Clinics 503. Clinics. (0-33). Credit 11. III**

See Veterinary Clinics for a full description of this course.

### FOR GRADUATES

**601. Food Hygiene. (3-4). Credit 4. I**

The study of causes and evidence of spoilage, and the detection of adulterants in fresh, canned, and cured foods of animal origin. Prerequisite: Veterinary Public Health 591 or 592.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in veterinary public health. Prerequisite: Degree of Doctor of Veterinary Medicine.

## Department of Wildlife Management

Professor W. B. Davis;
Associate Professors R. J. Baldauf, R. B. Davis; Assistant Professor J. G. Teer;
Instructors D. C. Carter, J. M. Inglis

**201. Wildlife Conservation and Management. (3-0). Credit 3. I, II**

An introduction to the wildlife and fishery resources of the United States with special reference to Texas. The importance of plants and animals in our economic and cultural life. An account of what has happened to North American wildlife with consideration of specific plans and methods for its rehabilitation, maintenance, and increase.

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*Becomes 590 September 1964.

**Becomes (2-2), credit 3, September 1964.

***Becomes (2-0), credit 2, September 1964.

****Becomes 595 September 1964.

**202. Natural History of the Vertebrates. (2-2). Credit 3. II**

Natural history of fishes, amphibians, reptiles, birds and mammals, as exemplified by selected representatives of each group. Not open to wildlife management majors.

**300. Field Studies. Credit 3. S**

Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates; experience in collecting and preparing study skins of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Head of Department.

**304. Conservation and Management of Fishes. (3-0). Credit 3. II**

The classification, habits, economic importance, and conservation of fishes. Not open to wildlife management majors.

**311. Ichthyology. (Fresh Water). (2-3). Credit 3. I** †

This course is designed to familiarize the student with the fresh-water fishes of the world. The approach to the subject matter will be mainly systematic, but the evolution, ecology, life history, and economy of the more important species will be treated. The fresh-water fishes of Texas will be emphasized and the practice will consist of the identification of 75-100 fish. Prerequisite: Biology 107.

**312. Ichthyology. (Marine). (2-3). Credit 3. II** †

A study of the marine fishes of the world, emphasizing fishes of Texas. Life history, ecology, distribution, evolution, and economic values of important species will be treated. Prerequisite: Wildlife Management 311. (Offered in 1963-64 and in alternate years thereafter.)

**315. Herpetology. (2-2). Credit 3. II** †

An introduction to the study of the structure, adaptation, classification, distribution, and economic importance of amphibians and reptiles. Prerequisite: Biology 107.

**316. Field Herpetology. (0-3). Credit 1. II**

Field work involving the collection and preservation of herpetological specimens; natural history; ecological relations. Prerequisites: Wildlife Management 315 or registration therein.

**400. Fisheries Survey. Credit 4. S**

A field course. Attention will be given to the life histories, ecology, and propagation of fishes important for sporting and food purposes. Distribution, identification, and field techniques. Prerequisite: Junior classification or approval of Head of Department.

**401. General Mammalogy. (2-2). Credit 3. I** †

Study of the structure, classification, and economic relations of mammals. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**402. General Ornithology. (2-2). Credit 3. II** †

Introduction to the study of birds, their structure, classification, geographic distribution, ecologic relations, and economic status. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**403. Animal Ecology. (2-3). Credit 3. I** †

Composition, structure, and energy relationships of plant-animal communities. The interaction of physical and biotic factors as they affect population levels and community development. Application of ecological principles to some current land use practices. Prerequisite: Range and Forestry 301.

**408. Techniques of Wildlife Management. (2-3). Credit 3. II** †

Methods and techniques in maintaining and increasing desirable wildlife and regulating population generally, with emphasis on practical aspects. Use of natural vegetation, the place and methods of census, restocking, game preserves, predatory animal control, provision of food and cover, farmer-sportsman relations, significance of succession, and other ecologic concepts to game management and related enterprises. Prerequisite: Senior classification in wildlife management or approval of instructor.

**410. Conservation and Management of Fishes. (3-0). Credit 3. II** †

Basic knowledge from ichthyology, biology of fishes, and limnology is related to the applied aspects of fresh water and marine fishery science. Emphasis is placed on methods of fish culture, habitat and population manipulation, disease and parasites of fishes and fundamentals of farm pond management.

**417. Biology of Fishes. (2-2). Credit 3. I** †

Treats the biology of fishes, including respiration, sense organs, feeding habits, breeding habits, anatomy, and adaptations to the environment. Emphasis will be placed upon the various physiological and morphological features of fishes, particularly as they relate to problems of distribution, populations, and management in Texas. Prerequisite: Biology 107.

**485. Wildlife Problems. Credit 1 to 3. I, II, S**

Individual study and research on a selected problem approved by the instructor. Prerequisite: Junior or senior classification.

## FOR GRADUATES

**601, 602. Vertebrate Systematics. (1-6). Credit 3 each semester. I, II**

The theory and practice of taxonomy as applied to vertebrates. Laboratory consists of individual problems on classification and distribution of selected groups of vertebrates; problems in nomenclature of birds, mammals, fishes and reptiles, based on Texas Cooperative Wildlife Collection. Survey of the literature of vertebrate taxonomy as related to the group selected; a study of vertebrate material from the systematic standpoint. Prerequisites: Wildlife Management 311, 315, 401, or 402, depending on group selected. (Offered in 1964-65 and in alternate years thereafter.)

**603. Vertebrate Ecology. (1-6). Credit 3. II**

The ecology and life histories of vertebrates with special reference to birds and mammals. The role of native vertebrates in relation to range, forest, and farm problems. Considerations will be given to community and environmental relations. Prerequisite: Wildlife Management 403 or equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**608. Techniques of Wildlife Management. (2-0). Credit 2. II**

Special techniques and current development in wildlife management practices. Prerequisite: Wildlife Management 408 or equivalent. (Offered in 1964-65 and in alternate years thereafter.)

**609. Wildlife Research Methods. (2-0). Credit 2. I**

A study of research methods as applied to wildlife management. (Offered in 1964-65 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the wildlife field with special reference to the literature. Prerequisite: Senior or graduate classification.

**685. Problems. Credit 2 to 6 each semester. I, II, S**

Credit to be adjusted in accordance with requirements of each individual case.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on selected wildlife problem to be used in thesis or dissertation.

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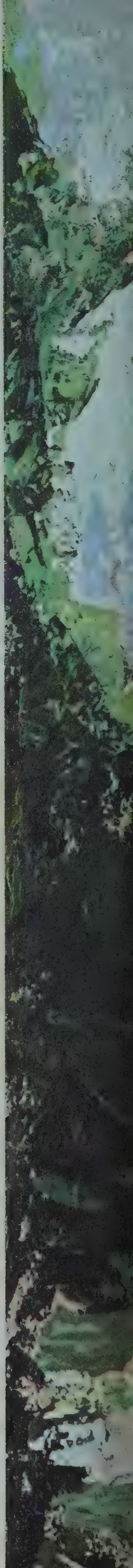

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1962/63

*Bulletin of the*

# Agricultural and Mechanical College of Texas

## 1962-63

## COVER

The beautiful All Faiths Chapel is the personification of religious emphasis on the campus at the Agricultural and Mechanical College of Texas. A gift of the Association of Former Students, the Chapel affords at all hours a reflective and reverent atmosphere for individual meditation and prayer. In keeping with the aspiration of the College to fully prepare its students for all of life's experiences, the Chapel symbolizes spiritual development to all students regardless of denomination or creed.

# BULLETIN

OF THE

# AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

Sixth Series, Vol. 9 February 1, 1962 No. 1

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## RECORD OF SESSION 1961-62

## ANNOUNCEMENTS FOR THE SESSION 1962-63

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85

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    - The Texas Agricultural Experiment Station
    - The Texas Agricultural Extension Service
    - The Texas Engineering Experiment Station
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| W. J. Graff, Ph.D. | *Dean of Instruction* |
| R. E. Patterson, Ph.D. | *Dean of Agriculture* |
| G. M. Watkins, Ph.D. | *Director of Agricultural Instruction* |
| R. D. Lewis, Ph.D. | *Director of Agricultural Experiment Station* |
| John E. Hutchison, M.Ed. | *Director of Agricultural Extension Service* |
| Frank W. R. Hubert, Ph.D. | *Dean of Arts and Sciences* |
| Fred J. Benson, M.S. | *Dean of Engineering* |
| Harold D. Bearden, M.A. | *Director of Engineering Extension Service* |
| Alvin A. Price, D.V.M., M.S. | *Dean of Veterinary Medicine* |
| James P. Hannigan, B.S. | *Dean of Students* |
| H. Lloyd Heaton, M.S. | *Director of Admissions and Registrar* |
| Charles A. Roeber, B.A., B.B.A. | *Business Manager* |

# FACULTY

(Correct as of December 1, 1961)

## ACADEMIC COUNCIL

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

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Rudder, James Earl, President of the College. (1958, 1959)

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1945)

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)

Benson, Fred Jacob, Dean of the School of Engineering. (1947, 1957)

Bridges, Charles Hubert, Professor of Veterinary Pathology. (1955, 1960)

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)

Burgess, Archie Rostron, Professor of Industrial Engineering. (1948, 1950)

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology. (1926, 1935)

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry. (1947, 1956)

Calaway, Paul Kenneth, Professor of Chemistry. (1957)

Calhoun, John C., Jr., Vice Chancellor for Development. (1955, 1960)

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery. (1958)

Chalk, Alfred Franklin, Professor of Economics. (1936, 1956)

Cochran, Robert Glenn, Professor of Nuclear Engineering. (1959)

Crawford, Charles William, Associate Dean of Engineering. (1919, 1957)

Cronk, Alfred Edward, Professor of Aeronautical Engineering. (1956)

Davis, Joe Eugene, Colonel, Inf., U.S.A.R., Commandant of the School of Military Sciences. (1930, 1951)

Davis, William B., Professor of Wildlife Management. (1937, 1946)

DeWerth, Adolphe Ferdinand, Professor of Floriculture. (1946, 1949)

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)

Gaines, J. C., Professor of Entomology. (1947, 1952)

Graff, William John, Dean of Instruction. (1961)

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)

Groneman, Chris Harold, Professor of Industrial Education. (1940, 1942)

Grumbles, Leland Creed, Professor of Veterinary Microbiology. (1949, 1957)

Hall, Wayne C., Dean of Graduate Studies. (1949, 1960)

Hallmark, Glen Duncan, Professor of Electrical Engineering. (1942, 1957)

Hannigan, James P., Dean of Students. (1959)

Harrington, Marion Thomas, Chancellor. (1924, 1953-57, 1959)

Hensarling, Paul Reginald, Associate Professor of Education and Psychology. (1958, 1961)

Hobgood, Price, Professor of Agricultural Engineering. (1939, 1958)

Holleman, Theo Rufus, Professor of Architecture. (1946, 1957)

Houze, Robert Alvin, Library Director. (1949, 1957)

Hubert, Frank William R., Dean of the School of Arts and Sciences. (1959)

Hutchison, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health. (1937, 1957)

Klipple, Edmund Chester, Professor of Mathematics. (1935, 1952)

Knebel, Earl H., Professor of Agricultural Education. (1955, 1961)

Leinweber, Charles Lee, Professor of Range and Forestry. (1960)

Leipper, Dale F., Professor of Oceanography. (1949)

Lewis, Robert Donald, Director of Texas Agricultural Experiment Station. (1946)

Lindsay, James Donald, Professor of Chemical Engineering (1938, 1946)

Lyman, Carl M., Professor of Biochemistry and Nutrition. (1940, 1949)

Lynch, Shirley Alfred, Professor of Geology. (1946)

Lyons, Charles Roger, Director of Student Health. (1956, 1957)

McGuire, Delbert, Professor of Journalism. (1961)

Mackin, John Gilman, Professor of Biology. (1950, 1960)

Milliff, John Henry, Professor of Veterinary Anatomy. (1936, 1941)

Morgan, Stewart Samuel, Professor of English. (1921, 1952)

Myers, James Arthur, Athletic Director. (1958)

Nance, Joseph Milton, Professor of History and Government. (1941, 1958)

Patterson, Raleigh Elwood, Dean of Agriculture. (1958, 1960)

Potter, James Gregor, Professor of Physics. (1945)

Potts, Richard Carmechial, Assistant Director of Agricultural Instruction. (1936, 1960)

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)

Quisenberry, John Henry, Professor of Poultry Science. (1936, 1946)

Roeber, Charles Arthur, Business Manager. (1929, 1954)

Rosberg, David William, Professor of Plant Physiology and Pathology. (1950, 1960)

Rupel, Isaac Walker, Professor of Dairy Science. (1945)

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences and Professor of Geography. (1934, 1959)

Simmang, Clifford Max, Professor of Mechanical Engineering. (1938, 1957)

Stevenson, Robert M., Professor of Business Administration. (1947, 1961)

Street, William Ezra, Professor of Engineering Graphics. (1941)

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology. (1947, 1953)

Tishler, Carl Edward, Professor of Health and Physical Education. (1941, 1947)

Trogdon, William O., Professor of Agronomy. (1958)

Turk, Richard Duncan, Professor of Veterinary Parasitology. (1944)

Watkins, Gustav McKee, Director of Agricultural Instruction. (1949, 1960)

Whiting, Robert Louis, Professor of Petroleum Engineering. (1946, 1954)

Woolket, Joseph John, Professor of Modern Languages. (1925, 1945)

Wright, Samuel Robert, Professor of Civil Engineering. (1923, 1946)

Zinn, Bennie A., Director of the Department of Student Affairs. (1945, 1954)

## GENERAL FACULTY

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Abbott, John Paul, Distinguished Professor of English. (1926, 1956)
B.A., Vanderbilt, 1925; Ph.D., Iowa, 1939.

Adamson, Arthur Douglas, Professor of Health and Physical Education. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1944.

Adkins, William Gray, Associate Professor of Agricultural Economics and Sociology. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1953.

Adkisson, Perry L., Associate Professor of Entomology. (1958)
B.S., Arkansas, 1950; M.S., 1954; Ph.D., Kansas State College, 1956.

Aldred, William Hughes, Assistant Professor of Agricultural Engineering. (1953, 1957)
B.S., Georgia, 1951; M.S., Agricultural and Mechanical College of Texas, 1956.

Alexander, Robert Benjamin, Associate Professor of Chemistry. (1952, 1959)
B.A., Baylor, 1945; M.A., 1946; Ph.D., Agricultural and Mechanical College of Texas, 1957.
(On leave of absence from 9-1-60 to 8-31-62.)

Allen, David Edward, Captain, Assistant Professor of Air Science. (1958)
B.S., United States Naval Academy, 1953.

Alter, Alan Brian, Assistant Professor of Mechanical Engineering. (1949, 1952)
B.S., Pittsburgh, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Reg. Prof. Engr.

Amason, Robert Daniel, Assistant Professor of Business Administration. (1960)
B.B.A., Agricultural and Mechanical College of Texas, 1951; M.B.A., 1958.

Ames, Robert Theodore, Instructor in Business Administration. (1961)
B.B.A., Agricultural and Mechanical College of Texas, 1960.

Amyx, James William, Professor of Petroleum Engineering. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1946; M.Eng., 1956; Reg. Prof. Engr.

Anderson, John Quincy, Professor of English. (1953, 1959)
A.B., Oklahoma Agricultural and Mechanical College, 1939; M.A., Louisiana State, 1948; Ph.D., North Carolina, 1952.

Andrews, Paul Milton, Associate Professor of Health and Physical Education. (1943, 1951)
B.S., Sul Ross State Teachers College, 1934; M.Ed., Agricultural and Mechanical College of Texas, 1945.

Arango, Ergasto Ramon, Instructor in Government. (1960)
B.S., Florida, 1951; M.A., Columbia, 1954; Ph.D., Florida, 1961.

Arnold, James Elwood, Instructor in Meteorology. (1961)
B.S., Agricultural and Mechanical College of Texas, 1960.

Ashcraft, Allan Coleman, Assistant Professor of History. (1956, 1960)
B.A., Agricultural and Mechanical College of Texas, 1950; M.A., Columbia, 1951; Ph.D., 1960.

Ashworth, Lee J., Jr., Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., California, 1951; M.S., 1954; Ph.D., 1958.

Atkins, Irvin Milburn, Agronomist (Agricultural Research Service, USDA, cooperating). (1939, 1954)
B.S., Kansas State College, 1928; M.S., 1936; Ph.D., Minnesota, 1945.

Atkinson, Robert Leon, Assistant Professor of Poultry Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950; Ph.D., California, 1958.

Atwater, William Felix, Captain, Assistant Professor of Air Science. (1958)
B.S., Berea College, 1949; M.A., George Peabody College for Teachers, 1950.

Axford, Roy Arthur, Associate Professor of Nuclear Engineering. (1960)
A.B., Williams College, 1950; S.B., Massachusetts Institute of Technology, 1952; S.M., 1955; Sc.D., 1958.

Bailey, Kenneth Ralph, Assistant Professor of Mathematics. (1946, 1954)
B.A., Texas, 1937; M.A., 1941.

Baldauf, Richard John, Associate Professor of Wildlife Management. (1952, 1959)
B.S., Albright College, 1949; M.S., Agricultural and Mechanical College of Texas, 1951; Ph.D., 1956.

Ball, Billie Joe, Assistant Professor of Electrical Engineering. (1959, 1961)
B.S., Mississippi State, 1956; M.S., 1959.

Ballinger, Richard Henry, Professor of English. (1954, 1957)
B.A., Texas, 1936; M.A., 1936; Ph.D., Harvard, 1953.

Banks, William Carl, Professor of Veterinary Medicine and Surgery. (1941, 1955)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Bardell, North Bruce, Jr., Assistant Professor of Engineering Graphics. (1953, 1957)
B.S., Agricultural and Mechanical College of Texas, 1953.

Barker, Donald Gene, Assistant Professor of Psychology. (1959)
B.A., Baylor, 1952; M.A., 1954.

Barker, Palmer Winfield, Associate Professor of Physics. (1946, 1949)
B.S., Missouri, 1932; M.A., 1933.

Barnard, Herbert Marvin, Assistant Professor of Electrical Engineering. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1955.
(On leave of absence from 9-1-61 to 8-31-62.)

Barzak, Robert William, Assistant Professor of English. (1955, 1958)
B.A., Agricultural and Mechanical College of Texas, 1949; M.A., Illinois, 1951; Ph.D., 1959.

Bashaw, Elexis C., Geneticist of Agricultural Research Service, USDA. (1951, 1955)
B.S., Purdue, 1947; M.S., 1948; Ph.D., Agricultural and Mechanical College of Texas, 1954.

Basye, Robert Eugene, Professor of Mathematics. (1940, 1952)
B.A., Missouri, 1929; M.A., Princeton, 1931; Ph.D., Texas, 1933.

Baty, James Bernard, Professor of Civil Engineering. (1948, 1950)
B.S., Agricultural and Mechanical College of Texas, 1925; M.C.E., Cornell, 1950; Reg. Prof. Engr.

Baugh, Orville Lee, Instructor in Mathematics. (1956)
B.S., North Texas State College, 1941; M.S., 1951.

Bayliss, Garland Erastus, Assistant Professor of History. (1956, 1958)
B.S., Arkansas, 1951; M.A., Texas, 1953.

Beachell, Henry M., Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Nebraska, 1930; M.S., Kansas State College, 1933.

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Beasley, Joseph Noble, Associate Professor of Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1949; M.S., 1956. (On leave of absence from 9-1-61 to 8-31-62.)

Bebout, Harley, Associate Professor of Agricultural Economics. (1939, 1959)
B.S., Missouri, 1925; M.S., Agricultural and Mechanical College of Texas, 1939.

Beckham, John Blair, Associate Professor of Chemistry. (1946, 1958)
A.B., Daniel Baker College, 1936; B.S., 1937; M.S., Agricultural and Mechanical College of Texas, 1950.

Beckham, Paul Miles, Instructor in Mechanical Engineering. (1960)
B.S., United States Naval Academy, 1954; M.S., Agricultural and Mechanical College of Texas, 1961.

Bell, Rurel Roger, Associate Professor of Veterinary Parasitology. (1952, 1958)
D.V.M., Georgia, 1952; M.S., Agricultural and Mechanical College of Texas, 1955.

Bell, Wiley Wayne, Captain, Assistant Professor of Military Science and Tactics. (1961)
B.S., Oklahoma State, 1953.

Bennett, Alvin Lowell, Associate Professor of English. (1954, 1957)
B.A., Texas, 1927; M.A., Washington, 1931; Ph.D., Texas, 1952.

Benson, Fred Jacob, Dean of Engineering, Executive Officer of the Texas Transportation Institute, and Professor of Civil Engineering. (1937, 1957)
B.S., Kansas State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1936; Reg. Prof. Engr.

Benton, Wilbourn Eugene, Associate Professor of Government. (1957)
B.A., Texas Technological College, 1939; M.A., 1941; Ph.D., Texas, 1948.

Bertrand, Clint Albert, Assistant Professor of Industrial Education. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1953.

Bird, Luther Smith, Associate Professor of Plant Physiology and Pathology. (1951, 1959)
B.S., Clemson College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1955.

Bitner, Claude Andrell, Jr., Assistant Professor of Economics. (1959)
B.B.A., Texas, 1950; M.A., 1956.

Blackhurst, Homer T., Professor of Horticulture. (1947, 1950)
A.B., Glenville State Teachers College, 1935; M.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., 1947.

Blank, Horace R., Professor of Geology. (1949, 1953)
B.S., Pennsylvania, 1919; Ph.D., 1924.

Bloodworth, Morris Elkins, Professor of Agronomy. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1953; Ph.D., 1958.

Blount, Charles Edwin, Instructor in Physics. (1960)
B.S., Texas Western College, 1954; M.S., Agricultural and Mechanical College of Texas, 1960.

Boone, James Leroy, Jr., Assistant Professor of Industrial Education. (1952, 1955)
B.S., Agricultural and Mechanical College of Texas, 1947; M.Ed., 1948.

Boone, Robert Leroy, Assistant Professor of Liberal Arts. (1960, 1961)
B.S., Houston, 1951; M.A., Sam Houston State Teachers College, 1954.

Boriskie, Ben Bernard, Associate Professor of Physics. (1941, 1959)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1948.

Boswell, James Louis, Instructor in Biology. (1961)
B.S., East Central State (Oklahoma), 1936; M.S., Oklahoma, 1938.

Branson, Robert Earl, Professor of Agricultural Economics and Sociology. (1955, 1958)
B.S., Southern Methodist, 1941; M.P.A., Harvard, 1948; M.A., 1949; Ph.D., 1954.

Brazzel, James Roland, Associate Professor of Entomology. (1957)
B.S., Louisiana State, 1951; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Breitenkamp, Edward Carlton, Associate Professor of Modern Languages. (1953, 1956)
B.A., Drake, 1936; M.A., 1938; Ph.D., Iowa, 1951.

Brewer, Burns W., Professor of Mathematics. (1938, 1957)
A.B., Missouri, 1935; A.M., 1936; Ph.D., 1938.

Bridges, Charles Hubert, Professor of Veterinary Pathology and Head of Department. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1954; Ph.D., 1957.

Brigham, Raymond D., Agronomist. (1957)
B.S., Texas Technological College, 1950; M.S., Iowa State, 1952; Ph.D., 1957.

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)
B.S., Agricultural and Mechanical College of Texas, 1921; M.S., Michigan State College, 1931.

Brown, Claude Harold, Assistant Professor of Sociology. (1960)
B.A., Berea College, 1955; M.A., Kentucky, 1957; Ph.D., Pennsylvania State, 1960.

Brown, Murray Allison, Assistant Professor of Dairy Science. (1955, 1958)
B.S., Michigan State College, 1950; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Brown, Meta Suche, Professor of Agronomy. (1940, 1955)
B.A., Texas, 1931; M.A., 1933; Ph.D., 1935.

Brown, Stewart Ellsworth, Instructor in Mechanical Engineering. (1951)

Brown, Sidney Overton, Professor of Biology. (1936, 1949)
B.A., Texas, 1932; Ph.D., 1936.

Brundidge, Kenneth Cloud, Assistant Professor of Meteorology. (1955, 1958)
B.A., Chicago, 1952; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Buchanan, Spencer Jennings, Professor of Civil Engineering. (1946)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., Massachusetts Institute of Technology, 1931; C.E., Agricultural and Mechanical College of Texas, 1948; Reg. Prof. Engr.

Burchard, Donald Dix, Professor of Journalism. (1948)
A.B., Beloit College, 1925; A.M., Missouri, 1938.

Burgess, Archie Rostron, Professor of Industrial Engineering and Head of Department. (1948, 1951)
B.S., Washington, 1932; M.S., 1938; Reg. Prof. Engr.

Burke, Horace Reagan, Assistant Professor of Entomology. (1958)
B.S., Sam Houston State Teachers College, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., 1959.

Burns, Edward Eugene, Associate Professor of Horticulture. (1956, 1959)
B.S., Purdue, 1950; M.S., 1952; Ph.D., 1956.

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology and Head of Department. (1926, 1935)
B.S., Agricultural and Mechanical College of Texas, 1923; D.V.M., 1926.

Burroughs, Albert Lawrence, Serologist of Department of Veterinary Microbiology. (1954, 1957)
B.S., Wyoming, 1938; M.S., Montana State College, 1941; Ph.D., California, 1946.

Butler, Marvin Harold, Assistant Professor of Economics. (1948)
A.B., McKendree College, 1940; M.A., Illinois, 1948.

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry and Head of Department. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947; Ph.D., Michigan State College, 1953.

Byrns, Robert Eugene, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1958)
B.A., Colorado State College of Education, 1933.

Caddess, James Harvey, Associate Professor of Mechanical Engineering. (1940, 1953)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1934; Reg. Prof. Engr.

Cain, Roy Edward, Assistant Professor of English. (1956, 1960)
B.A., North Texas State College, 1953; M.A., 1954.

Calaway, Paul Kenneth, Professor of Chemistry and Head of Department. (1957)
B.A., Arkansas College, 1931; M.S., Georgia Institute of Technology, 1933; Ph.D., Texas, 1938.

Caldwell, Augustus George, Associate Professor of Agronomy. (1954, 1955)
B.S.A., Toronto, 1946; M.A.A., 1948; Ph.D., Iowa State College, 1955.

Calhoun, John C., Jr., Vice-Chancellor for Development and Professor of Petroleum Engineering. (1955, 1960)
B.S., Pennsylvania State College, 1937; M.S., 1941; Ph.D., 1946; Reg. Prof. Engr.

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery and Head of Department. (1958)
B.S., Agricultural and Mechanical College of Texas, 1941; D.V.M., 1949.

Calvert, Wesley Donald, Assistant Professor of Journalism. (1954, 1957)
A.B., Missouri, 1951; B.J., 1951.

Camp, Bennie Joe, Associate Professor of Biochemistry and Nutrition. (1956, 1960)
B.S., East Texas State Teachers College, 1949; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Cantrell, Wallace Gene, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Capelle, Donald Gene, Assistant Professor of Civil Engineering. (1961)
B.S., Clemson Agricultural and Mechanical College, 1953; M.Eng., Agricultural and Mechanical College of Texas, 1960.

Carter, Dilford C., Instructor in Wildlife Management. (1961)
B.S., Southern Methodist, 1956; M.S., 1956.

Cartwright, Thomas Campbell, Professor of Animal Husbandry and of Genetics. (1958)
B.S., Clemson Agricultural College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1954.

Chalk, Alfred Franklin, Professor of Economics and Head of Department. (1936, 1956)
B.A., Baylor, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1950.

Chandler, David Jarrett, Major, Associate Professor of Military Science and Tactics. (1959, 1961)
B.S., United States Military Academy, 1949.

Clark, Robert Alfred, Assistant Professor of Meteorology. (1960, 1961)
B.S., Kansas State, 1948; M.S., Agricultural and Mechanical College of Texas, 1959.

Clark, William Jesse, Assistant Professor of Biology. (1957)
B.S., Utah State Agricultural College, 1950; M.S., 1956; Ph.D., 1958.

Clayton, William Howard, Associate Professor of Oceanography and Research Scientist. (1954, 1961)
B.S., Bucknell, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Cleland, Samuel Miles, Professor of Engineering Graphics. (1941, 1958)
B.A., West Texas State Teachers College, 1931; M.Ed., Agricultural and Mechanical College of Texas, 1940.

Cleveland, Donald E., Assistant Professor of Civil Engineering and of Industrial Engineering. (1959, 1961)
B.S., Massachusetts Institute of Technology, 1949; M.Eng., Yale, 1959.

Cochran, Robert Glenn, Professor of Nuclear Engineering and Head of Department. (1959)
A.B., Indiana, 1948; M.S., 1950; Ph.D., Pennsylvania State, 1957.

Cochrane, John Douglas, Assistant Professor of Oceanography and Research Scientist. (1956)
B.A., California, 1943; M.S., Scripps Institute of Oceanography, 1948.

Coffey, Lee Clayton, Professor of Agronomy. (1950, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1950; Ph.D., Iowa State, 1954.

Collier, Albert, Director, Galveston Marine Laboratory. (1958)
B.A., Rice Institute, 1933.

Collier, Jesse Wilton, Associate Agronomist. (1949, 1960)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1952; Ph.D., Rutgers, 1957.

Cook, Benjamin Davy, Associate Professor of Agricultural Education and Specialist in Extension Training. (1950, 1960)
B.S., Agricultural and Mechanical College of Texas, 1934; M.Ed., 1950; Ph.D., Wisconsin, 1957.

Cook, Elton D., Agronomist of Texas Agricultural Experiment Substation, Temple. (1949, 1952)
B.S., Texas Technological College, 1935; M.S., Kansas State, 1948; Ph.D., Nebraska, 1951.

Cooley, Bernard Matt, Assistant Professor of Veterinary Medicine and Surgery. (1960)
D.V.M., Agricultural and Mechanical College of Texas, 1948.

Coon, Jesse Bryan, Professor of Physics. (1946, 1957)
A.B., Indiana, 1932; M.A., 1935; Ph.D., Chicago, 1949.

Couch, Jack Gary, Instructor in Physics. (1961)
B.S., Utah State, 1958; M.S., Vanderbilt, 1959.

Couch, James Russell, Professor of Biochemistry and Nutrition and of Poultry Science. (1948, 1949)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; Ph.D., Wisconsin, 1948.

Courtney, Harley Macon, Assistant Professor of Business Administration. (1961)
B.B.A., Lamar State College of Technology, 1955; M.B.A., Agricultural and Mechanical College of Texas, 1961.

CoVan, Jack Philip, Professor of Industrial Engineering. (1946, 1956)
B.M.E., Ohio State, 1935; B.I.E., 1935; M.S., Illinois, 1942; Reg. Prof. Engr.

Cover, Sylvia A., Professor, Home Economics Department, Texas Agricultural Experiment Station. (1933, 1949)
B.S., Illinois, 1920; M.A., Missouri, 1929; Ph.D., 1933.

Cox, James Alexander, Instructor in Architecture. (1961)
B.A., Agricultural and Mechanical College of Texas, 1961.

Cox, Sidney Saunders, Assistant Professor of English. (1948, 1952)
B.A., Southwest Texas State Teachers College, 1932; M.A., 1939.

Craig, Robert Neal, Associate Professor of Agricultural Education. (1940, 1958)
B.S., Agricultural and Mechanical College of Texas, 1937.

Cratin, Paul David, Instructor in Chemistry. (1960)
B.S., Spring Hill College, 1951; M.S., St. Louis, 1954.

Crawford, Charles William, Associate Dean of Engineering and Professor of Mechanical Engineering. (1919, 1957)
B.S., Agricultural and Mechanical College of Texas, 1919; M.S., 1929; Reg. Prof. Engr.

Crawford, Paul B., Assistant Director of Texas Petroleum Research Committee. (1952)
B.S., Texas Technological College, 1943; M.S., Texas, 1946; Ph.D., 1949.

Creswell, Horace Staley, Assistant Professor of English. (1946, 1951)
B.S., Texas Technological College, 1935; M.A., Texas Christian, 1938.

Crittenden, Elmer Pratt, Assistant Professor of English. (1956)
B.A., Boston, 1939; M.A., Southern Methodist, 1946.

Cronk, Alfred Edward, Professor of Aeronautical Engineering and Head of Department. (1956)
B.S., College of Saint Thomas, 1937; M.S., Minnesota, 1946; Reg. Prof. Engr.

Crookshank, Herman Robert, Animal Nutritionist for the Department of Biochemistry and Nutrition, USDA. (1959)
B.S., Northeast Missouri State College, 1938; M.S., 1940; Ph.D., Iowa State, 1942.

Crow, Ulrich Wilson, Professional Counselor with Counseling and Testing Center, Assistant Professor. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Educ., 1956.

Dabbs, Jack Autrey, Professor of Modern Languages. (1950, 1959)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1950.

Dahlberg, Frank Iver, Professor of Animal Husbandry. (1936, 1947)
B.S., Agricultural and Mechanical College of Texas, 1925; M.S., Wisconsin, 1930.

Danti, Alfred, Associate Professor of Chemistry. (1961)
B.S., Colorado College, 1954; Ph.D., Massachusetts Institute of Technology, 1958.

Darrow, Robert Arthur, Professor of Range and Forestry. (1948, 1951)
B.S., New York State College of Forestry, 1932; M.S., Arizona, 1935; Ph.D., Chicago, 1937.

Davey, Ralph Hemmings, Jr., Assistant Professor of Engineering Graphics. (1955, 1958)
B.S., United States Military Academy, 1932; M.Eng., Agricultural and Mechanical College of Texas, 1959; Reg. Prof. Engr.

Davich, T. B., Entomologist, United States Department of Agriculture, Cotton Insect Program. (1956)
B.S., Ohio State, 1948; M.S., Wisconsin, 1951; Ph.D., 1953.

Davies, Ronald Edgar, Assisant Professor of Poultry Science. (1959)
B.S.A., British Columbia, 1954; M.S.A., 1956; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Davis, Donald Dwight, Instructor in Mathematics. (1960)
B.S., Michigan State, 1935; M.Ed., Cincinnati, 1950.

Davis, Daniel Rowland, Associate Professor of Sociology. (1935, 1947)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1935.

Davis, Joe Eugene, Colonel, Commandant of the School of Military Sciences. (1930, 1951)
B.S., Agricultural and Mechanical College of Texas, 1930.

Davis, Richard Bratton, Associate Professor of Wildlife Management. (1951, 1959)
B.S., Texas College of Arts and Industries, 1940; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1952.

Davis, Richard Harvey, Jr., Associate Professor of Veterinary Physiology and Pharmacology. (1951, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1956.

Davis, William B., Professor of Wildlife Management and Head of Department. (1937, 1946)
B.A., Chico State Teachers College, 1933; M.A., California, 1936; Ph.D., 1937.

Davison, Richard Read, Assistant Professor of Chemical Engineering. (1958)
B.S., Texas Technological College, 1949; M.S., Agricultural and Mechanical College of Texas, 1958.

Decker, John Petty, Assistant Professor of Physics. (1956, 1961)
B.S., Arkansas, 1949; M.S., 1953; Reg. Prof. Engr.

Dehlinger, Peter, Professor of Geophysics. (1954, 1957)
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943; Ph.D., 1950.

Deliz, John Donald, Instructor in Modern Languages. (1961)
B.A., California, 1951; M.A., Los Angeles State College, 1955.

Denison, John Scott, Associate Professor of Electrical Engineering. (1949, 1954)
B.S., New Mexico Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Engr.

Denton, Allen Eugene, Jr., Assistant Professor, Counseling and Testing Center. (1951, 1960)
B.A., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1949.

Denton, James Henry, Associate Professor of Veterinary Medicine and Surgery. (1958, 1961)
D.V.M., Agricultural and Mechanical College of Texas, 1945.

DeWerth, Adolphe Ferdinand, Professor of Floriculture. (1946, 1949)
B.S., Ohio State, 1930; M.S., 1931.

Dieckert, Julius Walter, Associate Professor of Biochemistry and Nutrition. (1960)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., 1955.

Dillingham, Harley Clay, Professor of Electrical Engineering. (1922, 1930)
B.S., Agricultural and Mechanical College of Texas, 1922; A.M., Columbia, 1930; Reg. Prof. Engr.

Dillon, Lawrence Samuel, Professor of Biology. (1948, 1961)
B.S., Pittsburgh, 1933; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1954.

Dobson, William Jackson, Professor of Biology and Professional Counselor, Counseling and Testing Center. (1947, 1960)
B.A., Austin College, 1939; Ph.D., Texas, 1946.

Donaldson, Joseph, Jr., Lecturer on Architecture. (1956)

Doran, Edwin Beale, Jr., Associate Professor of Geography. (1960)
B.A., Louisiana State, 1938; M.S., 1947; Ph.D., California, 1953.

Dowell, William Merl, Professor of Health and Physical Education. (1942, 1950)
B.S., Sam Houston State Teachers College, 1929; M.A., George Peabody College, 1932.

Dozier, James Hall, Assistant Professor of Business Administration. (1955, 1959)
LL.B., Texas, 1950; M.B.A., Agricultural and Mechanical College of Texas, 1961.

Drake, Flavious Flemings, Major, Associate Professor of Air Science. (1961)
M.B.A., Chicago, 1957.

Drew, Dan D., Assistant Professor of Industrial Engineering. (1960)
B.S., North Texas State College, 1950; M.S., 1951.

Druce, Albert John, Associate Professor of Electrical Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1950.

DuBeau, Normand Parent, Instructor in Journalism. (1961)
B.S., Connecticut, 1940; B.J., Missouri, 1940; M.A., 1941.

Duncan, Baxter T., Captain, Assistant Professor of Air Science. (1959, 1961)
B.B.A., Sam Houston State Teachers College, 1961.

Duncan, John Thomas, Associate Professor of History. (1943, 1960)
B.A., Simmons College, 1924; M.A., Texas Technological College, 1942.
(On leave of absence from 9-1-61 to 8-31-62.)

Dunlap, Wayne Alan, Assistant Professor of Civil Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1955.

Durbin, Leonel Damien, Assistant Professor of Chemical Engineering. (1961)
B.S., Texas College of Arts and Industries, 1957; Ph.D., Rice, 1961.

Earle, James Hubert, Assistant Professor of Engineering Graphics. (1957, 1960)
B.Arch, Agricultural and Mechanical College of Texas, 1955.

Eckles, William Elam, Assistant Professor of Business Administration. (1960)
B.S., Agricultural and Mechanical College of Texas, 1928; M.S., 1935.

Edmondson, Andrew Joseph, Instructor in Mechanical Engineering. (1961)
B.S., Texas Technological College, 1957; M.S., Pennsylvania State, 1960.

Edmondson, Vance Ward, Associate Professor of Agricultural Economics. (1956, 1959)
B.S., Arkansas, 1948; M.S., Oklahoma Agricultural and Mechanical College, 1950; Ph.D., Cornell, 1956.

Eisner, Melvin, Professor of Physics. (1948, 1957)
B.A., Brooklyn College, 1942; M.S., North Carolina, 1947; Ph.D., 1948.

Ekfelt, Fred Emil, Professor of English. (1938, 1951)
B.A., Iowa, 1931; M.A., 1932; Ph.D., 1941.

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)
B.S., United States Military Academy, 1933.

Elkins, Rollin Lafayette, Associate Professor of Business Administration. (1935, 1946)
B.S., Agricultural and Mechanical College of Texas, 1933; M.S., 1935.

Ellett, Edwin Willard, Associate Professor of Veterinary Medicine and Surgery. (1958, 1961)
D.V.M., Georgia, 1953; B.S., Virginia Polytechnic Institute, 1954; M.S., Agricultural and Mechanical College of Texas, 1961.

Ellis, William C., Assistant Professor of Animal Husbandry. (1961)
B.S., Louisiana Polytechnic Institute, 1953; M.S., Missouri, 1955; Ph.D., 1958.

Elmquist, Karl Erik, Associate Professor of English. (1935, 1947)
A.B., Southern Methodist, 1932; M.A., Texas, 1939.

El-Sayed, Sayed Zakaria, Assistant Professor of Oceanography. (1961)
B.S., Alexandria, 1949; M.S., 1951; Ph.D., Washington, 1959.

Endrizzi, John Edwin, Assistant Professor of Agronomy. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., Maryland, 1955.

Ergle, David R., Senior Plant Physiologist of Plant Sciences Department (Agricultural Research Service, USDA, cooperating). (1944)
B.S., Clemson College, 1926; M.S., North Carolina, 1928; Ph.D., 1930.

Esten, Clarence Kenyon, Assistant Professor of English. (1946, 1951)
A.B., Baylor, 1931; M.A., 1949.

Estes, Dwain McKinley, Assistant Professor of Education. (1959)
B.A., Baylor, 1948; M.Ed., Texas, 1950; Ed.D., 1958.

Eubank, Philip Toby, Assistant Professor of Chemical Engineering. (1961)
B.S., Rose Polytechnic Institute, 1958; Ph.D., Northwestern, 1961.

Evans, Benjamin Hampton, Assistant Professor of Architecture. (1955)
B.Arch, Agricultural and Mechanical College of Texas, 1952; M.Arch., 1961.

Evans, Chester Eugene, Instructor in Modern Languages. (1960)
B.A., Texas, 1955.

Fairbanks, Hardy Ewald, Assistant Professor of Civil Engineering. (1957, 1961)
B.S., Houston, 1956.

Fanguy, Roy Charles, Assistant Professor of Poultry Science. (1958)
B.S., Mississippi State College, 1951; M.S., Alabama Polytechnic Institute, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Fear, Frank Augustus, Assistant Professor of Veterinary Pathology. (1959, 1961)
D.V. M., Agricultural and Mechanical College of Texas, 1959.

Ferguson, Marvin Harry, Southwestern Director and National Research Coordinator of U. S. Golf Association, Green Section (Department of Soil and Crop Sciences cooperating). (1952, 1953)
B.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., Maryland, 1950.

Ferguson, Thomas Morgan, Associate Professor of Poultry Science. (1946, 1956)
B.A., Southwestern, 1936; M.S., Agricultural and Mechanical College of Texas, 1946; Ph.D., 1954.

Fisher, Flake Leroy, Associate Professor of Agronomy. (1949, 1959)
B.S., New Mexico College of Agriculture and Mechanic Arts, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1959.

Fleming, David Winston, Associate Professor of Mechanical Engineering. (1927, 1945)
B.S., Agricultural and Mechanical College of Texas, 1930; M.Ed., 1942.

Fletcher, Robert Holton, Associate Professor of Mechanical Engineering. (1947, 1958)
B.S., Pennsylvania State College, 1928; Reg. Prof. Engr.

Flournoy, Robert Wilson, Instructor in Biology. (1961)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1961.

Flowers, Archie Ingram, Associate Professor of Veterinary Microbiology. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1942; D.V.M., 1950; M.S., 1959.

Folweiler, A. D., Director of Texas Forest Service. (1949)
B.S., Pennsylvania State College, 1925; M.F., Yale, 1931; Ph.D., Wisconsin, 1943.

Ford, Peter Anthony, Instructor in History. (1960)
B.A., Providence College, 1956; M.A., Notre Dame, 1958; M.M.S., 1959.

Franceschini, Guy Arthur, Associate Professor of Meteorology. (1952, 1961)
B.S., Massachusetts, 1950; M.S., Chicago, 1952; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Franke, Harold William, Instructor in Animal Husbandry. (1961)
B.S., Agricultural and Mechanical College of Texas, 1947.

Franklin, Benjamin David, Instructor in Civil Engineering. (1958)
B.S., North Carolina State College, 1948; B.S., Agricultural and Mechanical College of Texas, 1958.

Fridel, George Edward, Instructor in Mathematics. (1957)
B.S., Houston, 1957.

Fudge, Joseph Franklin, Professor of Agronomy and State Chemist. (1929, 1949)
B.S., Illinois, 1924; M.S., Wisconsin, 1925; Ph.D., 1928.

Futrell, Maurice Chilton, Assistant Professor of Plant Physiology and Pathology and Plant Pathologist (Agricultural Research Service, USDA, cooperating.) (1958, 1959)
B.S., Western Kentucky State College, 1947; M.S., Wisconsin, 1949; Ph.D., 1952.

Gaddis, Alvis Mathew, Associate Professor of Mechanical Engineering. (1942, 1958)
A.B., Austin College, 1930.

Gail, Albert, Professor of Aeronautical Engineering. (1959)
Diplom Ingenieur, Munich Institute of Technology, 1932.

Gaines, J. C., Professor of Entomology and Head of Department. (1947, 1952)
B.S., Alabama Polytechnic Institute, 1925; M.S., 1926; Ph.D., Iowa State College, 1937.

Gallaway, Bob Mitchel, Professor of Civil Engineering. (1944, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1946; M.Eng., 1956; Reg. Prof. Engr.

Galvin, Thomas Joseph, Assistant Professor of Veterinary Parasitology. (1959, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1957; M.S., 1961. (On leave absence from 9-1-61 to 8-31-62.)

Gantt, Fred, Jr., Instructor in Government. (1961)
B.A., Southern Methodist, 1943; M.A., 1948.

Gardner, Frederick Albert, Assistant Professor of Poultry Science. (1959)
B.S., Vermont, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., Missouri, 1960.

Garretson, George Dwight, Assistant Professor of Agricultural Education. (1961)
B.S., Agricultural and Mechanical College of Texas, 1952.

Garrison, Roger William, Major, Associate Professor of Air Science. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.B.A., Indiana, 1957.

German, John Paul, Professor of Electrical Engineering. (1958)
B.S., Texas, 1940; M.S., 1949; Ph.D., 1955.

Getzin, Louis W., Associate Professor of Entomology. (1958)
B.S., Wisconsin, 1955; M.S., 1957; Ph.D., 1958.

Gibbons, Derek, Associate Professor of Chemistry. (1961)
B.S., Birmingham, England, 1951; Ph.D., 1954.

Gibbons, Eldred Harris, Associate Professor of Microbiology. (1925, 1939)
B.S.A., Tennessee, 1925; S.M., Chicago, 1929.

Gibbs, Leon Wilford, Associate Professor of Veterinary Anatomy. (1949, 1958)
B.S., Agricultural and Mechanical College of Texas, 1939; D.V.M., 1949; M.S., 1957.

Gibbs, Robert H., Associate Professor of Mechanical Engineering. (1956)
B.S., United States Naval Academy, 1925; Reg. Prof. Engr.

Gibson, Roy Howard, Instructor in Mechanical Engineering. (1933, 1947)

Gladden, James Kelly, Professor of Chemistry. (1959)
B.S., Howard College, 1942; M.S., Georgia Institute of Technology, 1944; Ph.D., Northwestern, 1952.

Godfrey, Curtis L., Associate Professor of Agronomy. (1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1948; Ph.D., Iowa State College, 1951.

Goode, Phillip Baron, Professor of Business Administration. (1946, 1949)
B.S., Southern Methodist, 1933; LL.B., 1936; LL.M., Texas, 1953.

Gott, George Edwin, Instructor in English. (1957)
B.A., Southeast Missouri State College, 1949; M.A., Texas, 1952.
(On leave of absence from 9-1-61 to 5-31-62.)

Gottschalk, Martin Edward, Instructor in Modern Languages. (1960)
B.A., Texas Lutheran College, 1951; M.A., Texas, 1960.

Gould, Frank Walton, Associate Professor of Range and Forestry and Curator of College Museum. (1949)
B.S., Northern Illinois State College, 1935; M.S., Wisconsin, 1937; Ph.D., California, 1941.

Gowing, Gene Martin, Assistant Professor of Veterinary Medicine and Surgery. (1959, 1961)
B.S., Agricultural and Mechanical College of Texas, 1957; D.V.M., 1959; M.S., 1961.

Graff, William John, Dean of Instruction. (1961)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Purdue, 1951.

Grant, Harold Lafayette, Instructor in History. (1961)
B.S., Mississippi Southern College, 1955; M.A., Mississippi, 1958.

Grant, Samuel J., Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Clemson Agricultural and Mechanical College, 1952.

Gravett, Howard L., Professor of Biology. (1946, 1954)
A.B., James Millikin, 1933; M.A., Illinois, 1934; Ph.D., 1939.

Greeley, Ralph Cordon, Instructor in Veterinary Anatomy. (1960)
B.S., Missouri, 1953; D.V.M., 1953.

Greer, Clayton Alvis, Associate Professor of English. (1938, 1949)
B.A., Texas, 1921; M.A., 1927; Ph.D., 1937.

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.B.A., Stanford, 1948.

Groneman, Chris Harold, Professor of Industrial Education and Head of Department; Coordinator of Teacher Education. (1940, 1956)
B.S., Kansas State Teachers College, 1931; M.S., 1935; D.Ed., Pennsylvania State College, 1950.

Gruber, Kenneth Willis, Lieutenant Colonel, Associate Professor of Air Science. (1960)
B.S., United States Air Force Institute of Technology, 1950; M.B.A., George Washington, 1955.

Grumbles, Leland Creed, Professor of Veterinary Microbiology and Head of Department. (1949, 1957)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1957.

Guthrie, William Spurgeon, Associate Professor of Mechanical Engineering. (1942, 1950)
B.S., Central State Teachers College, 1930; M.A., Oklahoma, 1935; Reg. Prof. Engr.

Hacskaylo, Joseph, Plant Physiologist of the Department of Plant Sciences. (1958, 1960)
A.B., West Virginia, 1949; M.S., 1950; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Hale, Fred, Professor of Animal Husbandry in Charge of Swine Investigations. (1922, 1927)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1925.

Hall, Charles Franklin, Associate Professor of Veterinary Microbiology. (1959)
B.S., Kansas State College, 1949; D.V.M., 1951; M.S., Michigan State, 1959.

Hall, Claude Hampton, Associate Professor of History. (1951, 1959)
B.A., Virginia, 1947; M.A., 1949; Ph.D., 1954.

Hall, Dan, Associate Professor of Mathematics. (1928, 1944)
A.B., North Carolina, 1927; A.M., 1928.

Hall, Frederick Charles, Associate Professor of Aeronautical Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., California Institute of Technology, 1957; Reg. Prof. Engr.

Hall, James Ewin, Instructor in Veterinary Pathology. (1961)
B.S., Texas Technological College, 1952; D.V.M., Agricultural and Mechanical College of Texas, 1961.

Hall, John William, Lecturer in Architecture. (1957)
B.S., Agricultural and Mechanical College of Texas, 1941.

Hall, Samuel Joseph, Instructor in Meteorology. (1960)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1960.

Hall, Wayne C., Dean of Graduate Studies and Professor of Plant Physiology and Pathology. (1949, 1960)
B.S., Iowa, 1941; M.S., 1946; Ph.D., 1948.

Hallmark, Glen Duncan, Professor of Electrical Engineering and Head of Department. (1942, 1958)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1946; Ph.D., 1953.

Ham, Joe Strother, Associate Professor of Physics. (1956, 1958)
Ph.B., Chicago, 1948; M.S., 1951; Ph.D., 1954.
(On leave of absence from 9-1-61 to 8-31-62.)

Hamilton, Thomas Rowan, Professor of Business Administration. (1929, 1937)
A.B., Washington and Lee, 1917; M.S., Columbia, 1924; Ph.D., 1938.

Hampton, Herbert Elwood, Professor of Agronomy. (1938, 1948)
B.S., Agricultural and Mechanical College of Texas, 1937; Ph.D., Missouri, 1943.

Hancock, Charles Kinney, Professor of Chemistry. (1946, 1949)
B.S., Southwest Texas State Teachers College, 1931; M.A., Texas, 1936; Ph.D., 1939.

Hanna, Ralph Lynn, Associate Professor of Entomology. (1949, 1956)
B.A., Stephen F. Austin State Teachers College, 1939; Ph.D., Agricultural and Mechanical College of Texas, 1951.

Hardaway, Bernice Aubrey, Associate Professor of Engineering Graphics. (1946, 1957)
B.S., East Texas State Teachers College, 1933; M.Ed., Agricultural and Mechanical College of Texas, 1948.

Hardeman, Lyman Bryce, Associate Professor of Industrial Education. (1947, 1957)
B.S., Kansas State Teachers College, 1939; M.Ed., Agricultural and Mechanical College of Texas, 1949.

Harmon, Gerald Stearns, Instructor in Physics. (1957)
B.A., Maine, 1953; M.S., 1956.

Harrington, Edwin Lincoln, Professor of Civil Engineering. (1939, 1957)
B.S., Wyoming, 1927; C.E., 1937; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1952; Reg. Prof. Engr.

Harrington, Marion Thomas, Chancellor. (1924, 1953)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1927; Ph.D., Iowa State College, 1941.

Harris, James Elliott, Instructor in Mathematics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1959.

Harris, Robert Leigh, Assistant Professor of History. (1951, 1955)
A.B., Alabama, 1945; M.A., 1946; Ph.D., Duke, 1956.

Harris, William Birch, Associate Professor of Chemical Engineering. (1956)
B.S., Colorado, 1941.

Harris, William Donald, Professor of Chemical Engineering. (1935, 1949)
B.S., Iowa State College, 1929; M.S., 1931; Ph.D., 1934; Reg. Prof. Engr. (On leave of absence from 2-1-61 to 1-31-62.)

Harrison, Arthur L., Plant Pathologist of Texas Agricultural Experiment Station, Yoakum. (1937, 1947)
B.S., Ontario Agricultural College, 1929; Ph.D., Cornell, 1935.

Hass, Nils Wulf, Instructor in Electrical Engineering. (1960)
B.S., Purdue, 1959.

Hauer, Louis Frederick, Associate Professor of English. (1937, 1961)
B.A., Dubuque, 1931; M.A., Iowa, 1933.

Haupt, Lewis McDowell, Jr., Professor of Electrical Engineering. (1930, 1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1935; Reg. Prof. Engr.

Hawkins, Leslie Virgle, Professor of Industrial Education. (1954, 1959)
B.S., Panhandle Agricultural and Mechanical College, 1938; M.S., Oklahoma Agricultural and Mechanical College, 1946; D.Ed., Pennsylvania State, 1953.

Hays, John Q., Professor of English. (1929, 1945)
A.B., Missouri, 1929; M.A., 1932; Ph.D., California, 1942.

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1956)
B.S., Stephen F. Austin State Teachers College, 1929; M.S., Agricultural and Mechanical College of Texas, 1936.

Heck, Walter W., Associate Professor of Plant Physiology and Pathology. (1959)
B.S., Ohio State, 1947; M.S., Tennessee, 1950; Ph.D., Illinois, 1954.

Hedgcock, Ernest Duval, Professor of English. (1936, 1949)
B.A., Tennessee, 1917; M.A., Texas, 1936.

Hedges, Richard Marion, Assistant Professor of Chemistry. (1960)
B.S., Southern Methodist, 1950; Ph.D., Iowa State, 1955.

Henry, Walter Keith, Assistant Professor of Meteorology. (1957)
B.S., Missouri, 1941; M.S., Chicago, 1949.

Hensarling, Paul Reginald, Associate Professor of Education and Psychology and Acting Head of the Department. (1958, 1961)
B.S., North Texas State College, 1933; M.S., 1940; Ed.D., Houston, 1957.

Henson, Robert Maurice, Instructor in Physics. (1961)
B.S., Agricultural and Mechanical College of Texas, 1960.

Hepburn, Charles McGuffey, Instructor in History and Government. (1960)
B.A., Stanford, 1950; M.A., 1957.

Hierth, Harrison Ewing, Associate Professor of English. (1946, 1957)
A.B., Illinois Wesleyan, 1935; B.Ed., Illinois State Normal, 1936; M.A., Illinois, 1942; Ph.D., Wisconsin, 1956.

Hildreth, Roland James, Assistant Director, Texas Agricultural Experiment Station. (1954, 1959)
B.S., Iowa State College, 1949; M.S., 1950; Ph.D., 1954.

Hillman, John Rolfe, Assistant Professor of Mathematics. (1938, 1946)
B.S., Millsaps College, 1923; M.A., Missouri, 1929.

Hinojosa, Jesus Hector, Instructor in Architecture. (1960)
B.Arch., Agricultural and Mechanical College of Texas, 1960.

Hinton, Jimmy Herbert, Instructor in Electrical Engineering. (1961)
B.S., Agricultural and Mechanical College of Texas, 1960.

Hirsch, Teddy James, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.Eng., 1953; Ph.D., 1961.

Hobgood, Price, Professor of Agricultural Engineering and Head of Department. (1939, 1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1940; Reg. Prof. Engr.

Hohn, Charles Moran, Assistant Professor of Agricultural Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Holcomb, John W., Jr., Associate Professor of Agricultural Education. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Ed., 1953.

Holcomb, Robert Marion, Professor of Civil Engineering. (1947)
B.S., Arizona, 1936; M.S., Iowa State College, 1941; Ph.D., 1956; Reg. Prof. Engr.
(On leave of absence from 6-1-61 to 8-31-63.)

Holdredge, Edwin Sereno, Professor of Mechanical Engineering. (1939, 1957)
B.S., Tennessee, 1938; M.S., 1939; Reg. Prof. Engr.

Holland, Charles Donald, Professor of Chemical Engineering. (1952, 1959)
B.S., North Carolina State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1953.

Holleman, Theo Rufus, Professor of Architecture and Head of Division. (1946, 1958)
B.Arch., Agricultural and Mechanical College of Texas, 1940; M.Arch., 1951; Reg. Prof. Arch.

Holt, Ethan Cleddy, Professor of Agronomy. (1948, 1957)
B.S., Alabama Polytechnic Institute, 1943; M.S., Purdue, 1948; Ph.D., 1950.

Holt, Oris Milton, Associate Professor of Agricultural Education. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946.

Hood, Donald Wilbur, Professor of Oceanography. (1946, 1960)
B.S., Pennsylvania State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1950.

Hope, Lannes Homer, Assistant Professor of Psychology. (1961)
B.S., Texas Technological College, 1949; M.Ed., 1950; Ph.D., Texas, 1960.

Hopkins, Sewell Hepburn, Professor of Biology. (1935, 1947)
B.S., William and Mary College, 1927; M.A., Illinois, 1930; Ph.D., 1933.

Horsley, Wendell Graham, Assistant Professor of Architecture. (1959, 1961)
B.F.A., Denver, 1950.

Horton, Guy Mann, Instructor in Journalism. (1961)
B.S., East Texas State, 1953; M.Ed., 1957.

Hotchkiss, Thomas Atkins, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1961)
B.A., Virginia Military Institute, 1937.

Houze, Robert Alvin, Library Director. (1949, 1957)
A.B., Denver, 1940; B.L.S., 1941.

Hovorak, Louis Martin, Instructor in Mathematics. (1946)
B.S., Agricultural and Mechanical College of Texas, 1943; M.Ed., 1952.

Hoyle, Samuel Cooke, Jr., Professor of Business Administration. (1947, 1957)
LL.B., Texas, 1926; B.A., 1946; M.A., 1948.

Hubert, Frank William R., Dean of Arts and Sciences. (1959)
B.A., Texas, 1938; M.A., 1945; Ph.D., 1950.

Hudgins, Ellis A., Acting Instructor in History. (1961)
B.A., Baylor, 1954; B.D., Southwestern Baptist Theological Seminary, 1957; M.A., Baylor, 1961.

Huebner, George Lee, Jr., Senior Research Scientist, Department of Oceanography and Meteorology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1946; M.S., 1951; Ph.D., 1953.

Huggett, Milton Alfred, Assistant Professor of English. (1946, 1951)
B.A., Rochester, 1929; B.D., Episcopal Theological School, 1933; M.A., Baylor, 1952.

Hughes, Martin Collins, Professor of Electrical Engineering. (1923, 1932)
B.S., Illinois, 1917; E.E., 1926; Reg. Prof. Engr.
(On leave of absence.)

Hunter, Parks Caldwell, Jr., Assistant Professor of English. (1955, 1958)
B.A., Miami, 1948; B.Ed., 1949; M.A., 1950; Ph.D., Texas, 1958.

Hurt, John Tom, Professor of Mathematics. (1936, 1947)
B.A., Rice Institute, 1931; M.A., 1932; Ph.D., 1935.

Huss, Donald Lee, Assistant Professor of Range and Forestry. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1954; Ph.D., 1959.

Hutchison, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1949; M.Ed., 1950.

Ibert, Edward Robert, Instructor in Oceanography. (1960)
B.S., Tulane, 1950; M.S., Agricultural and Mechanical College of Texas, 1957.

Inglis, Jack Morton, Instructor in Wildlife Management. (1958)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1952.

Irving, John H., Jr., Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1943.

Isbell, Arthur Furman, Professor of Chemistry. (1953, 1961)
B.A., Baylor, 1937; M.S., Texas, 1941; Ph.D., 1943.

Isham, Elmer Rex, Instructor in Physics. (1961)
B.S., Agricultural and Mechanical College of Texas, 1958; M.S., 1961.

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health and Head of Department. (1937, 1957)
B.S., Agricultural and Mechanical College of Texas, 1924; D.V.M., 1926.

James, Kate Longstreth, Instructor in English. (1960)
B.A., Los Angeles State College, 1956; M.A., 1960.

Jernigan, Jesse Stewart, Assistant Professor of English. (1952, 1954)
B.A., North Texas State College, 1933; M.A., Southern Methodist, 1946; M.A., California, 1950.

Jessee, William Taze, Captain, Assistant Professor of Military Science and Tactics. (1960)
B.S., United States Military Academy, 1954.

Jimenez, Rudolph August, Assistant Professor of Civil Engineering. (1959)
B.S., Arizona, 1948; M.S., 1951.

Joham, Howard Ernest, Professor of Plant Physiology and Pathology. (1946, 1959)
B.A., Santa Barbara College, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., Iowa State College, 1950.

Jones, Charles Edward, Instructor in Physics. (1957)
B.S., Arkansas, 1952; M.S., 1956.

Jones, Claude Kelly, Assistant Professor of Veterinary Medicine and Surgery. (1961)
B.S., Agricultural and Mechanical College of Texas, 1943; D.V.M., 1943.

Jones, Jerrel Boyd, Instructor in Electrical Engineering. (1960)
B.S., Southern Methodist, 1958; M.S., 1960.

Jones, Truman Ross, Jr., Professor of Civil Engineering. (1947, 1960)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1955.

Jungerman, Paul Frank, Associate Professor of Veterinary Microbiology. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1947; M.S., 1959.

Justin, James Robert, Instructor in Agronomy. (1960)
B.S., Pennsylvania State, 1955; M.S., 1957.

Kadow, William Bruce, Assistant Professor of English. (1954, 1959)
A.B., Arkansas, 1951; M.A., 1952.

Kahan, Archie Marion, Executive Director of Texas Agricultural and Mechanical Research Foundation. (1953, 1954)
B.A., Denver, 1936; M.A., 1940; M.S., California Institute of Technology, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Kane, Richard Andrew, Assistant Professor of Physics. (1961)
S.B., Massachusetts Institute of Technology, 1956; A.M., Harvard, 1956.

Kasten, Frederick H., Assistant Professor of Biology. (1956, 1957)
B.A., Houston, 1950; M.A., Texas, 1951; Ph.D., 1954.
(On leave of absence from 2-1-61 to 1-31-62.)

Kavanaugh, Milam Shelby, Associate Professor of Psychology. (1947, 1951)
B.A., Texas, 1934; M.A., 1934.

Keel, Loyd Bush, Assistant Professor of English. (1942, 1947)
B.A., Texas, 1927; M.A., 1933.

Keese, Charles Joseph, Professor of Civil Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Kemler, Arden Grant, Associate Professor of Veterinary Anatomy. (1959)
D.V.M., Kansas State College, 1950; M.S., Georgia, 1959.

Kenagy, Herbert Glenn, Associate Professor of Business Administration. (1955, 1957)
Ph.B., Central Missouri Teachers College, 1912; A.B., Missouri, 1916; B.S., 1916; M.A., Minnesota, 1917.

Kennedy, Harvey Thomas, Distinguished Professor of Petroleum Engineering. (1949)
B.S., Cornell, 1921; Ph.D., Johns Hopkins, 1928; Reg. Prof. Engr.

Kent, Jack Thurston, Associate Professor of Mathematics. (1936, 1952)
A.B., Lambuth College, 1930; M.A., Arkansas, 1931.

Keown, Ernest Ray, Professor of Mathematics. (1952, 1960)
B.S., Texas, 1946; Ph.D., Massachusetts Institute of Technology, 1950.

Kerley, Sidney Auston, Director of Counseling and Testing Center and Associate Professor of Education. (1952, 1960)
B.A., Agricultural and Mechanical College of Texas, 1939; M.Ed., North Texas State College, 1950.

Kidd, Harry Lee, Jr., Associate Professor of English. (1939, 1950)
B.A., Texas, 1935; M.A., 1938.

Killebrew, James Bryan, Captain, Assistant Professor of Air Science. (1958)
B.S., Houston, 1951; M.Eng., Agricultural and Mechanical College of Texas, 1961.

Kilmer, Robert E., Assistant Professor of Industrial Engineering. (1961)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1958.

Kincannon, John Alvin, Associate Professor of Agricultural Economics. (1946, 1960)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1949; Ph.D., 1952.

King, Donald Roy, Associate Professor of Entomology. (1953, 1958)
B.S., Baldwin-Wallace College, 1949; M.S., Ohio State, 1951; Ph.D., 1952.

King, General Tye, Associate Professor of Animal Husbandry. (1953, 1960)
B.S., Kentucky, 1950; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Kinman, Murray Luther, Agronomist of the Department of Soil and Crop Sciences. (1950)
B.S., Kansas State College, 1942; M.S., Iowa State College, 1944; Ph.D., 1950.

Klipple, Edmund Chester, Professor of Mathematics and Head of Department. (1935, 1952)
B.A., Texas, 1926; Ph.D., 1932.

Knapp, Robert Andrew, Instructor in Mathematics. (1957)
B.S., United States Naval Academy, 1922; M.Ed., Agricultural and Mechanical College of Texas, 1954.

Knebel, Earl H., Professor of Agricultural Education and Head of Department. (1955, 1961)
B.S., Montana State College, 1946; M.Ed., Agricultural and Mechanical College of Texas, 1951; D.Ed., Oklahoma Agricultural and Mechanical College, 1955.

Koenig, Karl Joseph, Associate Professor of Geology. (1955, 1957)
B.S., Illinois, 1941; M.S., 1946; Ph.D., 1949.

Kohel, Russel James, Geneticist. (1959)
B.S., Iowa State College, 1956; M.S., Purdue, 1958; Ph.D., 1959.

Konecny, Frank Jack, Executive Assistant, Engineering Extension Service. (1955)
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Kornicker, Louis Sampson, Associate Professor of Oceanography. (1961)
B.S., Alabama, 1941; B.S., 1942; M.A., Columbia, 1954; Ph.D., 1957.

Kraemer, Duane Carl, Instructor in Animal Husbandry. (1960)
B.S., Wisconsin, 1955; M.S., Agricultural and Mechanical College of Texas, 1960.

Kranz, Edward Douglas, Instructor in Mechanical Engineering. (1952)

Krise, George Martin, Associate Professor of Biology. (1959)
B.A., Texas, 1946; M.A., 1948; Ph.D., 1952.

Kroitor, Harry Peter, Assistant Professor of English. (1958)
B.A., Saskatchewan, 1946; M.A., 1950; Ph.D., Maryland, 1957.

Krueger, Willie F., Professor of Poultry Science. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1949; Ph.D., Missouri, 1952.

Krupinski, Raymond Andrew, Instructor in Business Administration. (1961)
B.S., St. Benedict College (Kansas), 1960.

Kunkel, Harriott Orren, Professor of Animal Husbandry and of Biochemistry and Nutrition. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1948; Ph.D., Cornell, 1950.

Kunze, George William, Professor of Agronomy. (1952, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1950; Ph.D., Pennsylvania State College, 1952.

Kunze, Otto Robert, Associate Professor of Agricultural Engineering (1956)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Iowa State College, 1951.
(On leave of absence from 9-1-61 to 8-31-62.)

Kutach, Wilbur Dee, Professional Counselor and Assistant Professor, Counseling and Testing Center. (1952, 1960)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1952.

Kyre, Martin Theodore, Jr., Instructor in History and Government. (1959)
B.A., Ohio Wesleyan, 1950; M.A., Washington, 1957.

LaMotte, Charles, Professor of Biology. (1930, 1939)
B.A., Texas, 1929; M.A., 1929; Ph.D., Illinois, 1937.

Landiss, Carl Wilson, Professor of Health and Physical Education. (1943, 1954)
B.S., Abilene Christian College, 1935; M.Ed., Agricultural and Mechanical College of Texas, 1947; D.Ed., Pennsylvania State College, 1951.

Lane, Harry Cleburne, Associate Professor of Plant Physiology and Pathology. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1951; Ph.D., Iowa State College, 1953.
(On leave of absence from 7-1-61 to 6-30-62.)

Lang, Herbert Howard, Associate Professor of History. (1956, 1959)
B.A., Texas, 1949; M.A., 1950; Ph.D., 1954.

Laverty, Carroll Dee, Professor of English. (1939, 1955)
A.B., Colorado, 1933; A.M., 1934; Ph.D., Duke, 1951.

Laywell, Clifton Myron, Instructor in Animal Husbandry. (1960, 1961)
B.S., Southwest Texas State Teachers College, 1956.

Lee, Dean Ralph, Assistant Professor of Chemistry. (1941, 1947)
B.S., Memphis State College, 1937; M.S., Agricultural and Mechanical College of Texas, 1939.

Leighton, Rudolph Elmo, Professor of Dairy Science. (1947, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1932; M.S., 1943; Ph.D., Agricultural and Mechanical College of Texas, 1956.
(On leave of absence from 9-1-61 to 8-31-63.)

Leinweber, Charles Lee, Professor of Range and Forestry and Head of Department. (1960)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1953; Ph.D., 1956.

Leipper, Dale F., Professor of Oceanography and Meteorology and Head of Department. (1949, 1950)
B.S., Wittenberg College, 1937; M.A., Ohio State, 1939; Ph.D., California, 1950.

Letbetter, Thomas Doyle, Associate Professor of Business Administration. (1948)
B.B.A., Texas, 1933; M.S., Agricultural and Mechanical College of Texas, 1947; C.P.A., 1949.

Lewis, Robert Donald, Director of Texas Agricultural Experiment Station. (1946)
B.S., Pennsylvania State College, 1919; Ph.D., Cornell, 1926.

Liebhafsky, Erwin Eugene, Professor of Economics. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Illinois, 1950.

Lindquist, Donald A., Entomologist. (1961)
B.S., Oregon State, 1952; M.S., Iowa State, 1956; Ph.D., 1958.

Lindsay, James Donald, Professor of Chemical Engineering and Head of Department. (1938, 1944)
B.S., Michigan, 1924; M.S., 1925; Ph.D., 1934; Reg. Prof. Engr.

Linger, Irving Oscar, Associate Professor of Economics. (1961)
A.B., Ohio, 1939; M.A., Ohio State, 1942; Ph.D., Texas, 1958.

Little, Van Allen, Professor of Entomology. (1923, 1937)
B.A., Sam Houston State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1925; Ph.D., 1943.

Logan, Brian Warren, Research Scientist in Oceanography. (1959)
B.S., West Australia, 1954; Ph.D., 1956.

Logan, Earl, Jr., Assistant Professor of Mechanical Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1958; Ph.D., Purdue, 1961; Reg. Prof. Engr.

Lowe, Dan Copeland, Assistant Professor of Business Administration. (1955, 1961)
B.S., Stephen F. Austin State College, 1946; M.Ed., 1951.

Loyd, Coleman Monroe, Assistant Professor of Physics and Coordinator of the National Science Foundation Programs. (1953, 1961)
B.S., Nebraska State Teachers College, 1939; M.A., Wayne, 1948; M.S., Agricultural and Mechanical College of Texas, 1955.

Luke, Hugh Jay, Jr., Instructor in English. (1960)
B.A., Texas, 1956; M.A., 1957.

Luther, Herbert Adesla, Professor of Mathematics. (1937, 1947)
B.A., Pittsburgh, 1934; M.S., Iowa, 1935; Ph.D., 1937.

Lyerly, Paul J., Research Coordinator, Substation No. 17, Texas Agricultural Experiment Station, Ysleta. (1942, 1958)
B.S., North Carolina State College, 1938; M.S., Iowa State College, 1940; Ph.D., 1942.

Lyle, Robert Reed, Assistant Professor of Mathematics. (1937, 1946)
B.S., Washington and Jefferson College, 1931; M.A., Buffalo, 1933.

Lyles, Henry Francis, Instructor in Business Administration. (1958)
B.B.A., North Texas State College, 1956; M.B.A., 1957.

Lyman, Carl Morris, Professor of Biochemistry and Nutrition and Head of Department. (1940, 1949)
B.S., Oregon, 1931; A.M., Oregon State College, 1933; Ph.D., Pittsburgh, 1937.

Lynch, Shirley Alfred, Professor of Geology and Head of Department of Geology and Geophysics. (1946)
B.S., Missouri, 1928; M.S., 1931; E.M., 1935; Reg. Prof. Engr.

Lyons, Charles Rogers, Director of Student Health. (1956, 1957)
A.B., Miami, 1938; M.D., Ohio State, 1941.

McAfee, Thomas Edison, Professor of Agronomy. (1939, 1957)
B.S., Oklahoma Agricultural and Mechanical College, 1939; M.S., 1940; Ph.D., Agricultural and Mechanical College of Texas, 1953.

McCandless, Charles Emery, Assistant Professor of Physical Education. (1961)
B.S., Agricultural and Mechanical College of Texas, 1956; M.Ed., 1958.

McCasland, William Richard, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957.
(On leave of absence from 9-1-61 to 8-31-62.)

McCrady, James David, Assistant Professor of Veterinary Physiology and Pharmacology. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1952; D.V.M., 1958.

McCulley, William Straight, Associate Professor of Mathematics. (1937, 1957)
B.A., Iowa State, 1932; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1956.

McCully, Wayne Gunther, Associate Professor of Range and Forestry. (1948, 1960)
B.S., Colorado State College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1958.

McCune, William Edward, Professor of Agricultural Engineering. (1959)
B.S., Kansas State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1944.

McGee, Roger Valentine, Associate Professor of Mathematics. (1928, 1948)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1938.

McGinty, Ralph Jerry, Instructor in Agricultural Engineering. (1961)
B.S., Kansas State, 1959; M.S., 1960.

McGuire, Delbert, Professor of Journalism and Head of Department. (1961)
B.J., Texas, 1947; M.Jour., 1948.

McGuire, John Gilbert, Professor of Architecture and Assistant to the Dean of Engineering. (1935, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1937; B.S., 1944; Reg. Prof. Engr.

McLellan, Hugh John, Professor of Oceanography. (1957, 1961)
B.S., Dalhousie University, Halifax, Nova Scotia, 1941; M.S., 1947; Ph.D., Scripps Institute of Oceanography, 1956.

McMurry, Edgar Dowling, Assistant to the Dean of Veterinary Medicine. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1951.

McNeely, John Gordon, Professor of Agricultural Economics. (1947, 1950)
B.S., South Dakota State College, 1933; M.S., 1934; Ph.D., Wisconsin, 1941.

McNiel, Norbert Arthur, Assistant Professor of Genetics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1935; M.Ed., 1952; Ph.D., 1955.

MacKellar, Alan Douglas, Instructor in Physics. (1961)
B.S.E., Michigan, 1958; M.S., 1960.

Mackin, John Gilman, Professor of Biology and Head of Department. (1950, 1960)
B.S., East Central State College, Ada, Oklahoma, 1924; M.S., Illinois, 1927; Ph.D., 1933.

Magee, Aden Combs, Professor of Agricultural Economics. (1955, 1956)
B.S., Kansas State College, 1924; M.S., Agricultural and Mechanical College of Texas, 1926.

Mamaliga, Emil, Associate Professor of Health and Physical Education. (1947, 1957)
B.S., Ohio State, 1943; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Manning, Walter Scott, Associate Professor of Business Administration. (1941, 1947)
B.B.A., Texas College of Arts and Industries, 1932; M.B.A., Texas, 1940; C.P.A., 1952.

Marsh, James Hyde, III, Assistant Professor of Architecture. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1957.

Martin, Lee Jackson, Associate Professor of English. (1946, 1957)
B.S., Texas, 1941; M.A., 1948; Ph.D., Stanford, 1956.

Mason, Paul M., Associate Professor of Engineering Graphics. (1946, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1946.

Mattern, Terrence John, Assistant Professor of English. (1953, 1957)
B.A., George Peabody College, 1947; M.A., 1947.

Maxwell, Norman Paul, Associate Horticulturist. (1946, 1955)
B.S., Delaware, 1943; M.S., Agricultural and Mechanical College of Texas, 1949.

Medlen, Ammon Brown, Associate Professor of Biology. (1946, 1955)
B.A., Baylor, 1930; M.A., 1932; Ph.D., Agricultural and Mechanical College of Texas, 1952.

Meinke, Wilmon William, Associate Professor of Chemical Engineering. (1936, 1961)
B.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1949.

Merritt, Michael Henry, Instructor in Mathematics. (1961)
B.A., Lamar State College of Technology, 1961.

Mestanza, Walter Froilan, Assistant Professor of Veterinary Pathology. (1960)
D.V.M., Universidad Nacional de San Marcos (Lima), 1951; M.S., Virginia Polytechnic Institute, 1959.

Metzer, Robert Benjamin, Instructor in Agronomy. (1958)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1959.

Meyers, Edward Arthur, Associate Professor of Chemistry. (1956, 1961)
B.S., Michigan, 1950; Ph.D., Minnesota, 1955.

Middleton, Errol Bathurst, Professor of Chemistry. (1922, 1942)
B.A., Illinois, 1919; M.S., 1921; Ph.D., 1938.

Miller, Charles Edward, Assistant Professor of Biology. (1959)
B.S., Furman, 1951; M.A., North Carolina, 1954; Ph.D., 1957.

Miller, Charles Standish, Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956; Ph.D., 1959.

Miller, Jarvis Ernest, Associate Professor of Agricultural Economics. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Purdue, 1951; Ph.D., 1954.
(On leave of absence from 2-5-61 to 3-31-63.)

Miller, Thomas Lloyd, Associate Professor of History. (1946, 1957)
B.A., East Texas State Teachers College, 1935; M.A., 1945; Ph.D., Texas, 1956.

Milliff, John Henry, Professor of Veterinary Anatomy and Head of Department. (1936, 1941)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; D.V.M., 1936; Ph.D., Texas, 1958.

Mills, Jim Frank, Assistant Professor of Agronomy. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Mitchell, Richard Warren, Assistant Professor of Physics. (1947, 1954)
B.S., Lynchburg College, 1943; M.S., Agricultural and Mechanical College of Texas, 1953.

Moehlman, Carl B., Instructor in Mathematics. (1942)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1932.

Mohr, Hubert Charles, Associate Professor of Horticulture. (1946, 1956)
B.S., Ohio State, 1938; M.S., 1939; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Monroe, Haskell Moorman, Jr., Instructor in History. (1959)
B.A., Austin College, 1952; M.A., 1954; Ph.D., Rice, 1961.

Moore, Albert Vernon, Professor of Dairy Science. (1937, 1944)
B.S., Purdue, 1927; M.S., 1933; Ph.D., Michigan State College, 1948.

Moore, Bill C., Associate Professor of Mathematics. (1937, 1948)
A.B., Kansas, 1929; A.M., 1931; A.M., Princeton, 1937.

Moore, Clarence Albert, Associate Professor of Agricultural Economics. (1954, 1958)
B.S., West Texas State College, 1945; M.S., Illinois, 1946.

Moore, Donald Sylvester, Assistant Professor of Agricultural Economics and Sociology. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1938; M.S., 1940; Ph.D., Minnesota, 1956.

Moore, Richard Wayne, Associate Professor of Veterinary Microbiology. (1958, 1961)
D.V.M., Agricultural and Mechanical College of Texas, 1955; M.S., 1956.

Morgan, Stewart Samuel, Professor of English and Head of Department. (1921, 1952)
B.A., Cincinnati, 1926; M.A., Ohio State, 1927; Ph.D., 1933.

Moyer, Vance Edwards, Professor of Meteorology. (1958, 1961)
B.S., Pennsylvania State, 1950; M.S., 1951; Ph.D., 1954.

Mullins, Benjamin Franklin Kelso, Professor of Engineering Graphics. (1921, 1954)
A.B., Emory, 1919; M.S., 1922; M.R.E., Southwestern Baptist Theological Seminary, 1927; M.S., Agricultural and Mechanical College of Texas, 1944; Reg. Prof. Engr.

Myers, James Arthur, Athletic Director. (1958)
B.S., Tennessee, 1947.

Nance, Joseph Milton, Professor of History and Head of Department of History and Government. (1941, 1958)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1941.

Nash, James Mosely, Instructor in Mechanical Engineering. (1957)
B.S., Houston, 1957.
(On leave of absence from 9-1-61 to 8-31-62.)

Naugle, Norman Wakefield, Instructor in Mathematics. (1958)
B.A., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Nelson, Al B., Professor of History. (1937, 1956)
B.A., Texas Christian, 1932; M.A., 1933; Ph.D., California, 1937.

Nelson, Bardin Hubert, Professor of Sociology. (1950, 1956)
B.S., Louisiana State, 1942; M.A., 1943; Ph.D., 1950.

Nichols, Reuben Brian, Instructor in English. (1960)
B.A., Baylor, 1949; M.A., 1951; LL.B., 1954.

Niles, George Alva, Assistant Professor of Agronomy. (1953, 1959)
B.S., New Mexico State, 1949; M.S., Oklahoma State, 1950; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Noyes, Theodore Alvan, Assistant Professor of Mechanical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M. S., 1957; Reg. Prof. Engr.

O'Bannon, Lester Severance, Professor of Mechanical Engineering. (1948)
B.M.E., Kentucky, 1915; M.E., 1939; Reg. Prof. Engr.

Old, William Donald, II, Captain, Assistant Professor of Military Science and Tactics. (1960)
B.S., United States Military Academy, 1954.

Oliver, John Eoff, Assistant Professor of Business Administration. (1959)
B.B.A., Texas, 1929; M.S., Agricultural and Mechanical College of Texas, 1937.

Oliver, John Percy, Professor of Engineering Graphics. (1936, 1956)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1936; Reg. Prof. Engr.

Olson, Edward O., Pathologist of Department of Soil and Crop Sciences, USDA, Substation No. 15. (1949)
B.S., South Dakota State, 1940; M.S., Colorado State, 1944; Ph.D., Louisiana State, 1948.

Olson, Robert Merle, Assistant Professor of Civil Engineering. (1959, 1961)
B.S., Texas, 1947; M.S., Rice Institute, 1959.

Orr, Joseph Anderson, Professor of Civil Engineering. (1928, 1944)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1933; Reg. Prof. Engr.

Orts, Frank August, Instructor in Animal Husbandry. (1960)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Osborne, Hubert George, Lecturer in Veterinary Public Health. (1961)
B.V.Sc., Sydney (Australia), 1944.

Packenham, Edward S., Associate Professor of Business Administration. (1947, 1955)
B.S., Lombard College, 1928; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1949.

Page, John Orion, Associate Professor of Chemistry. (1948, 1951)
B.S., Rochester, 1927; Ph.D., Illinois, 1933.

Palmer, Leslie Lloyd, Associate Professor of Health and Physical Education. (1951, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1951.

Parker, Grady P., Professor of Education. (1940, 1950)
B.A., North Texas State Teachers College, 1929; M.A., Southern Methodist, 1935; Ed.D., Texas, 1942.

Parker, Travis Jay, Professor of Geology. (1947, 1952)
B.S., Texas Technological College, 1933; M.A., Texas, 1939; Ph.D., 1952; Reg. Prof. Engr.

Parry, Douglas Farlow, Professor of Education and Psychology. (1956)
B.A., Utah, 1937; M.A., 1938; Ph.D., Syracuse, 1942.

Pate, David Azariah, Instructor in Floriculture. (1960)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1961.

Paterson, Donald R., Associate Horticulturist, Department of Soil and Crop Sciences. (1952, 1956)
B.S., Cornell, 1947; M.S., California, 1950; Ph.D., Michigan State, 1952.

Patterson, LaVerne Victory, Assistant Professor of Industrial Education. (1956)
B.S., Illinois, 1940; M.S., 1948.

Patterson, Raleigh Elwood, Dean of Agriculture. (1958, 1960)
B.S., Louisiana State, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., 1943.

Pawlisch, Paul E., Assistant Professor of Agronomy. (1959)
B.S., Wisconsin, 1955; M.S., 1957; Ph.D., 1959.

Peach, Robert Marvin, Major, Associate Professor of Military Science and Tactics. (1959)
B.A., Randolph-Macon College, 1941.

Pedigo, John Randolph, Associate Professor of Petroleum Engineering. (1953)
B.S., Texas, 1935; B.A., 1935.

Peirce, James Franklin, Assistant Professor of English. (1946, 1951)
A.B., Illinois, 1940; M.A., Iowa, 1942.

Penberthy, Walter Lawren, Professor of Health and Physical Education. (1926, 1959)
B.S., Ohio State, 1926.

Perry, Bruce A., Horticulturist, Department of Soil and Crop Sciences. (1946, 1951)
B.S., Wake Forest College, 1930; M.A., 1936; Ph.D., Virginia, 1942.

Perry, Haile Deucalion, Assistant Professor of Mathematics. (1955, 1959)
B.S., Sam Houston State Teachers College, 1939; M.A., 1949.

Perry, John Vivian, Jr., Assistant Professor of Mechanical Engineering. (1949, 1955)
B.S., Virginia Polytechnic Institute, 1947; M.S., Agricultural and Mechanical College of Texas, 1954; Reg. Prof. Engr.

Peters, Isaac Isaac, Associate Professor of Dairy Science. (1950, 1952)
B.S.A., Manitoba, 1942; M.S., Michigan State College, 1944; Ph.D., Iowa State College, 1947.

Pierce, Kenneth Ray, Assistant Professor of Veterinary Pathology and Veterinary Microbiology. (1961)
D.V.M., Agricultural and Mechanical College of Texas, 1957.

Pinnell, Charles, Assistant Professor of Civil Engineering. (1958)
B.S., Texas Technological College, 1952; M.S., Purdue, 1958.
(On leave of absence from 9-16-61 to 7-1-62)

Piper, Charles Woods, Captain, Assistant Professor of Air Science. (1961)
B.A., George Washington, 1949; M.A., Stanford, 1957.

Ponthieux, Nicholas Archibald, Associate Professor of Health and Physical Education. (1941, 1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1950.

Porter, Jimmie Roy, Instructor in Industrial Engineering. (1961)
B.S., Agricultural and Mechanical College of Texas, 1958.

Porter, Kenneth Boyd, Agronomist of Department of Soil and Crop Sciences. (1947, 1957)
B.S., Kansas State College, 1940; M.S., Iowa State College, 1947; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Potter, George Edwin, Professor of Zoology. (1939)
B.S., Ottawa, 1921; M.S., Iowa, 1923; Ph.D., 1927; D.Sc., Ottawa, 1946.

Potter, James Gregor, Professor of Physics and Head of Department. (1945)
B.S., Princeton, 1928; M.S., New York, 1931; Ph.D., Yale, 1939.

Potts, Richard Carmechial, Assistant Director of Agricultural Instruction and Professor of Agronomy. (1936, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1935; M.S., Agricultural and Mechanical College of Texas, 1945; Ph.D., Nebraska, 1950.

Powell, Francis Warren, Assistant Professor of English. (1937, 1944)
B.A., Austin College, 1920; M.A., Texas, 1928.

Prescott, John Mack, Professor of Biochemistry and Nutrition. (1952, 1959)
B.S., Southwest Texas State Teachers College, 1941; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., Wisconsin, 1952.

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; D.V.M., 1949; M.S., 1956.

Price, Manning A., Associate Professor of Entomology. (1940, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1941.

Provost, Richard Leon, Instructor in Education and Psychology and of Counseling and Testing Center. (1956, 1960)
B.A., Drake, 1951; M.S., 1956.

Putnam, Harlan Ray, Associate Professor of Economics. (1941, 1946)
B.S., Iowa State College, 1935; M.A., 1941.

Quinby, John Roy, Agronomist of Texas Agricultural Experiment Station, Chillicothe. (1924, 1925)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Quinn, Major Charles, Instructor in Modern Languages. (1960)
B.S., Stanford, 1948; M.A., 1952.
(On leave of absence from 9-1-61 to 8-31-62.)

Quisenberry, John Henry, Professor of Poultry Science and Head of Department. (1936, 1946)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., Illinois, 1933; Ph.D., 1936.

Rakoff, Henry, Associate Professor of Chemistry. (1953, 1957)
B.S., City College of New York, 1944; M.S., Purdue, 1948; Ph.D., 1950.

Ramge, John Christian, Associate Professor of Veterinary Medicine and Surgery. (1959)
D.V.M., Ohio State, 1942; M.S., 1950; Ph.D., 1955.

Randall, John Del, Assistant Professor of Nuclear Engineering. (1958, 1959)
B.S., California, 1955; M.S., 1956.

Randolph, Neal Malcolm, Associate Professor of Entomology. (1957)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1938.

Rangan, L. Kasturi, Assistant Professor of Physics. (1961)
B.S., Maharaja's College (India), 1948; M.S., Delhi (India), 1950; Ph.D., Kansas, 1961.

Ransdell, Clifford Howell, Assistant to the Dean of Engineering and Professor of Engineering Graphics. (1937, 1960)
B.S., Texas Technological College, 1937; B.S., Agricultural and Mechanical College of Texas, 1953; Sc.D., Howard Payne College, 1956; M.Ed., Texas, 1957; Reg. Prof. Engr.

Ray, Sammy Mehedy, Assistant Professor of Oceanography. (1959)
B.S., Louisiana State, 1942; M.A., Rice Institute, 1952; Ph.D., 1954.

Redden, Joseph Eugene, Assistant Professor of Journalism. (1959)
B.A., Hardin-Simmons, 1947; M.A., 1948.
(On leave of absence from 6-1-61 to 5-31-62.)

Redmond, Harold Edwin, Professor of Veterinary Medicine and Surgery. (1940, 1952)
D.V.M., Agricultural and Mechanical College of Texas, 1939.

Reeves, Robert Gatlin, Professor of Genetics. (1928, 1947)
B.S., Mississippi State College, 1922; M.S., 1923; Ph.D., Iowa State College, 1928.

Reid, Robert Osborne, Professor of Oceanography and Meteorology. (1951, 1959)
B.E., Southern California, 1946; M.S., Scripps Institute of Oceanography, 1948.

Reiser, Raymond, Professor of Biochemistry and Nutrition. (1949, 1954)
A.B., Western Reserve, 1929; Ph.D., Ohio State, 1936.

Rekoff, Michael George, Jr., Associate Professor of Electrical Engineering. (1954, 1961)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955; Ph.D., Wisconsin, 1961; Reg. Prof. Engr.

Reyna, Eddie, Instructor in Physics. (1961)
B.S., Sam Houston State Teachers College, 1950; M.S., Agricultural and Mechanical College of Texas, 1959.

Rhodes, Robert Raymond, Associate Professor of Range and Forestry. (1946, 1954)
B.S.F., Louisiana, 1937; M.S., Agricultural and Mechanical College of Texas, 1951.

Rhodes, William Herschel, Major, Associate Professor of Military Science and Tactics. (1959)
B.S., Arkansas State College, 1949.

Richardson, Luther Ray, Professor of Biochemistry and Nutrition. (1946, 1949)
B.S., Georgetown College, 1923; A.M., Missouri, 1928; Ph.D., 1932.

Richmond, Thomas Rollin, Agronomist of Department of Soil and Crop Sciences (Agricultural Research Service, USDA, cooperating). (1931, 1954)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1938; Ph.D., Minnesota, 1948.

Rife, William Thomas, Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1950.

Riggs, John Kamm, Professor of Animal Husbandry. (1941, 1955)
B.S., Iowa State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1941.

Rivers, George W., Agronomist, Department of Soil and Crop Sciences (Agricultural Research Service, USDA, cooperating). (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., 1957.

Robertson, Walter Volley, Instructor in Biology. (1960)
B.S., Stephen F. Austin State College, 1951; M.S., Agricultural and Mechanical College of Texas, 1959.

Roche, John Edward, Associate Professor of Business Administration. (1957)
B.S., Baylor, 1946; M.A., Texas, 1950; Ph.D., 1956.

Rode, Norman Frederick, Professor of Electrical Engineering. (1922, 1930)
B.S., Clemson College, 1919; M.S., Agricultural and Mechanical College of Texas, 1929; E.E., Clemson College, 1939; Reg. Prof. Engr.

Rodenberger, Charles Alvord, Associate Professor of Aeronautical Engineering. (1960)
B.S., Oklahoma State, 1948; M.S., Southern Methodist, 1959; Reg. Prof. Engr.

Rodewald, Fred Arthur, Instructor in English. (1959)
B.A., Agricultural and Mechanical College of Texas, 1958; M.A., North Texas State College, 1959.

Roeber, Charles Arthur, Business Manager. (1929, 1954)
B.B.A., Texas, 1929; B.A., 1929.

Romane, William Murry, Associate Professor of Veterinary Medicine and Surgery. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1943.

Roots, Edmund Nelson, Jr., Assistant Professor of Electrical Engineering. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956.

Rosberg, David William, Professor of Plant Physiology and Pathology and Head of Department of Plant Sciences. (1950, 1960)
B.A., St. Olaf College, 1940; M.S., Ohio State, 1946; Ph.D., 1949.

Rose, Norman Carl, Associate Professor of Chemistry. (1956, 1961)
B.S., California, 1950; Ph.D., Kansas, 1957.

Ross, Henry, Professor of Agricultural Education. (1935)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1935.

Rotsch, Melvin Medford, Professor of Architecture. (1950, 1955)
B.S., Texas, 1928; M.Arch, Harvard, 1930.

Rowan, Neilon Joyce, Assistant Professor of Civil Engineering and Assistant Research Engineer, Texas Transportation Institute. (1959)
B.S., Texas Technological College, 1957; M.S., Agricultural and Mechanical College of Texas, 1959.

Rudder, James Earl, President of the College. (1958, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; LL.D., Baylor, 1960.

Rupel, Isaac Walker, Professor of Dairy Science and Head of Department. (1945)
B.S., Illinois, 1923; M.S., Wisconsin, 1924; Ph.D., 1932.

Russell, Daniel, Professor of Sociology. (1926)
A.B., Baylor, 1922; A.M., Chicago, 1928.

Russell, Leon Horace, Jr., Assistant Professor of Veterinary Public Health. (1959)
B.S., Missouri, 1956; D.V.M., 1956; M.P.H., Tulane, 1958.

Russell, William Low, Professor of Geology. (1946, 1951)
B.A., Yale, 1920; M.S., 1922; Ph.D., 1927.
(On leave of absence from 9-1-61 to 6-1-62.)

Ryan, Cecil Benjamin, Assistant Professor of Poultry Science. (1947, 1949)
B.S., Texas College of Arts and Industries, 1938; M.S., Agricultural and Mechanical College of Texas, 1947.

Samson, Charles Harold, Jr., Professor of Aeronautical Engineering and of Civil Engineering. (1960)
B.S., Notre Dame, 1947; M.S., 1948; Ph.D., Missouri, 1953; Reg. Prof. Engr.

Sanders, Horace M., Jr., Captain, Assistant Professor of Military Science and Tactics. (1961)
B.S., Agricultural and Mechanical College of Texas, 1945.

Sandstedt, John Leonard, Assistant Professor of Business Administration. (1954, 1960)
B.A., Texas, 1942; LL.B., 1947.

Sanford, Tommy Eugene, Assistant Professor of Meteorology. (1960, 1961)
B.S., Texas, 1954.

Sasaki, Yoshikazu, Research Scientist in Oceanography and Meteorology. (1956, 1957)
M.S., Tokyo, 1950; Ph.D., 1955.

Schatte, Curtis Eric, Instructor in English. (1960)
B.A., Sam Houston State Teachers College, 1949; M.A., 1952.

Schertz, Keith Francis, Geneticist. (1959)
B.S., Illinois, 1949; M.S., 1950; Ph.D., Cornell, 1957.

Schiller, Robert Edwin, Jr., Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1949; Reg. Prof. Engr.

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences; Professor of Geography and Head of Department. (1934, 1959)
B.A., Iowa State Teachers College, 1927; M.A., Clark, 1928; Ph.D., Nebraska, 1935.

Schrader, Allen, Assistant Professor of English. (1957, 1961)
B.A., Los Angeles State College, 1956; M.A., 1957.

Schroeder, Harry William, Plant Pathologist of Department of Plant Sciences, AMS, USDA. (1957)
B.S., Minnesota, 1951; M.S., 1955; Ph.D., 1955.

Schroeder, Melvin Carroll, Associate Professor of Geology. (1954, 1956)
B.S., State College of Washington, 1942; M.S., 1947; Ph.D., 1953.

Segner, Edmund Peter, Jr., Assistant Professor of Civil Engineering. (1954, 1956)
B.S., Texas, 1949; M.S., 1952; Reg. Prof. Engr.

Segrest, Herman Brazill, Professor of Health and Physical Education. (1945, 1958)
B.S., North Texas State Teachers College, 1937; M.S., 1946; M.Ed., Agricultural and Mechanical College of Texas, 1955.

Seward, Clay Luzenberg, Jr., Associate Professor of Geology and of Civil Engineering. (1948, 1952)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1950; Geol.E., 1953.

Shelton, Maurice, Assistant Animal Husbandman of Texas Agricultural Experiment Station, Department of Animal Husbandry. (1950, 1957)
B.S., Tennessee, 1948; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Shepperd, James Nolen, Assistant Professor of English. (1941, 1947)
B.A., Texas, 1931; M.A., 1936.

Shubinski, Robert Parker, Instructor in Civil Engineering. (1958)
B.A., Rice Institute, 1957; B.S., 1958.
(On leave of absence from 9-1-61 to 5-31-62.)

Sicilio, Fred, Associate Professor of Chemistry. (1961)
B.S., Centenary College, 1951; M.A., Vanderbilt, 1953; Ph.D., 1956.

Simmang, Clifford Max, Professor of Mechanical Engineering and Head of Department. (1938, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1938; Ph.D., Texas, 1952; Reg. Prof. Engr.

Simons, Donald Frederick, Assistant Professor of Business Administration. (1961)
B.B.A., Houston, 1954; M.B.A., Texas, 1955.

Sims, Stillman Austin, Associate Professor of Mathematics. (1942, 1959)
B.S., Southwest Texas State Teachers College, 1939; M.S., Agricultural and Mechanical College of Texas, 1944.

Sittler, Orvid Dayle, Assistant Professor of Physics. (1961)
B.S., Nebraska, 1948; M.S., 1950; Ph.D., Pennsylvania State, 1961.

Skrabanek, Robert Leonard, Professor of Sociology. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947; Ph.D., Louisiana State, 1949.

Skrivanek, John Marion, Associate Professor of Modern Languages. (1952, 1959)
B.A., Texas, 1938; M.A., 1946; Ph.D., Charles (Prague), 1948.

Smerdon, Ernest Thomas, Associate Professor of Agricultural Engineering. (1959)
B.S., Missouri, 1951; M.S., 1956; Ph.D., 1959.

Smith, Benjamin Frederick, Major, Associate Professor of Air Science. (1960)
A.B., Wittenberg College, 1953; M.B.A., Ohio State, 1956.

Smith, Fred Emmett, Professor of Geology and of Geography. (1948, 1956)
B.S., Louisiana State, 1930; M.S., 1932.

Smith, Frank Miller, Associate Professor of Civil Engineering. (1948, 1957)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1939; Reg. Prof. Engr.

Smith, James Clifton, Superintendent of Substation No. 3, Angleton. (1951)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947.

Smith, James Douglas, Assistant Professor of Genetics. (1959)
B.S., Iowa State College, 1950; M.S., 1956; Ph.D., 1960.

Smith, Ronald Edward, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Smith, Robert Lee, Jr., Associate Professor of Industrial Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952.

Snuggs, Roland Edward, Associate Professor of Chemistry. (1924, 1946)
A.B., Georgetown College, 1920; M.S., Florida, 1923; B.S., Agricultural and Mechanical College of Texas, 1937.

Snyder, Roy Webster, Extension Meat Specialist, Texas Agricultural Experiment Station. (1930)
B.S., Iowa State College, 1921; M.S., 1922.

Sorensen, Anton Marinus, Jr., Associate Professor of Animal Husbandry. (1955, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., Cornell, 1951; Ph.D., 1953.

Sorensen, Harold Benjamin, Associate Professor of Agricultural Economics and Sociology. (1951, 1956)
B.S., South Dakota State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Sorenson, Jerome Wallace, Professor of Agricultural Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1948.

Sorrels, Joseph Harrell, Professor of Civil Engineering. (1941, 1948)
A.B., Texas Christian, 1924; M.S., Vanderbilt, 1925; B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

Sperry, John Jerome, Professor of Biology. (1941, 1951)
B.A., Nebraska, 1936; M.A., Missouri, 1938; Ph.D., Nebraska, 1942.

Sperry, Omer Edison, Professor of Range and Forestry. (1946, 1949)
A.B., Peru, Nebraska, State College, 1925; M.A., Nebraska, 1931; Ph.D., 1934.

Spurlock, William W., Instructor in Chemistry. (1958)
B.A., Daniel Baker College, 1924; M.S., Agricultural and Mechanical College of Texas, 1961.

Stacell, Alan Louis, Assistant Professor of Architecture. (1960, 1961)
B.F.A., Illinois, 1955; M.F.A., 1960.

Stallings, Henry Green, Instructor in Mechanical Engineering. (1946)

Stark, Lawrence Edward, Professor of Engineering Graphics. (1941, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1951.

Staten, Raymond Dale, Associate Professor of Agronomy. (1956, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1947; M.S., Nebraska, 1949; Ph.D., 1951.

Stelly, Randall, Associate Professor of Agricultural Economics and Sociology. (1956, 1960)
B.S., Southwestern Louisiana Institute, 1940; M.S., Agricultural and Mechanical College of Texas, 1947; Ph.D., Louisiana State, 1956.

Stephenson, Henson Knowlen, Professor of Civil Engineering. (1945, 1957)
B.S., Alabama Polytechnic Institute, 1923; M.S., Michigan, 1931; C.E., Alabama Polytechnic Institute, 1941.

Stern, Louis Harold, Assistant Professor of Economics. (1955, 1957)
B.S., Illinois, 1947; M.A., California, 1954.

Stevenson, Leland Lewis, Major, Associate Professor of Military Science and Tactics. (1960)
B.S., Agricultural and Mechanical College of Texas, 1948.

Stevenson, Robert M., Professor of Business Administration and Acting Head of Division. (1947, 1961)
B.A., Duke, 1937; M.A., Pennsylvania State College, 1946; C.P.A., 1948; D.B.A., Indiana, 1955; C.L.U., 1955

Stewart, Billy Ray, Assistant Professor of Agricultural Engineering (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1959.

Stewart, Norman Arthur, Jr., Associate Professor of Business Administration. (1946, 1957)
LL.B., Baylor, 1938.

Stipe, Dennis Ray, Instructor in Agricultural Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Stokes, Elmore Ewing, Jr., Associate Professor of English. (1951, 1958)
B.A., Texas, 1943; M.A., 1948; Ph.D., 1951.

Storey, James Benton, Associate Professor of Horticulture. (1957, 1961)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1953; Ph.D., California, 1957.

Stout, Neil Ralph, Instructor in History. (1961)
A.B., Harvard, 1954; M.S., Wisconsin, 1958; Ph.D., 1961.

Street, William Ezra, Professor of Engineering Graphics and Head of Department. (1941)
B.S., Texas Technological College, 1930; M.A., 1933; LL.D., Harding College, 1947; Reg. Prof. Engr.

Stuverud, Homer Alton, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1960)
B.A., State Teachers College, Mayville, North Dakota, 1937; M.A., North Carolina, 1954.

Tadlock, William Carthan, Assistant Professor of Business Administration. (1961)
B.S., Mississippi State College, 1957; M.B.A., Mississippi State, 1958.

Taylor, Dee Orville Noble, Associate Professor of Veterinary Pathology. (1961)
B.S., Colorado Agricultural and Mechanical College, 1952; D.V.M., 1954; M.S., Purdue, 1960; Ph.D., 1961.

Taylor, Lloyd Chamberlin, Jr., Assistant Professor of History. (1956, 1958)
B.A., Lehigh, 1949; M.A., 1951; Ph.D., 1956.

Tefertiller, Kenneth Ray, Assistant Professor of Agricultural Economics. (1959)
B.S., Oklahoma State, 1952; M.S., 1957; Ph.D., Illinois, 1959.

Thames, Walter Hendrix, Jr., Associate Professor of Plant Physiology and Pathology. (1959)
B.S.A., Florida, 1947; M.A., 1948; Ph.D., Illinois, 1959.

Thomas, William Belton, Assistant Professor of Agricultural Education. (1961)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1958.

Thompson, Aylmer Henry, Associate Professor of Oceanography and Meteorology. (1960)
A.B., California at Los Angeles, 1947; M.A., 1948; Ph.D., 1960.

Thompson, Herbert Gordon, Jr., Associate Professor of Business Administration. (1951, 1954)
B.S., Miami, 1947; M.B.A., 1949.

Thompson, John George Hatch, Professor of Mechanical Engineering. (1938, 1954)
B.S., Pennsylvania State College, 1933; M.E., 1938; M.S., Agricultural and Mechanical College of Texas, 1950; Reg. Prof. Engr.

Thompson, Robert Dale, Assistant Professor of Business Administration. (1960)
B.A., DePauw, 1925; M.A., Trinity, 1960.

Thompson, Russell G., Assistant Professor of Agricultural Economics and Sociology. (1961)
B.A., Minnesota, 1957.

Thornton, William Lee, Instructor in Business Administration. (1958)
B.A., Indiana, 1957; M.B.A., 1958.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology and Head of Department. (1947, 1953)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1936; M.P.A., Harvard, 1947; D.P.A., 1949.

Tishler, Carl Edward, Professor of Health and Physical Education and Head of Department. (1941, 1947)
B.S., Ohio State, 1926; M.A., Western Reserve, 1935.

Tittle, Morris Edward, Associate Professor of Mathematics. (1943, 1959)
B.A., East Texas State Teachers College, 1923; M.A., Texas, 1937.

Titus, Robert Stephen, Instructor in Veterinary Medicine and Surgery. (1960)
B.S., Oklahoma State, 1958; D.V.M., 1959.

Traxler, Ralph N., Professor of Civil Engineering. (1959)
A.B., Colorado, 1920; M.A., 1922; Ph.D., Wisconsin, 1926.

Treacy, John Joseph, Assistant Professor of Economics. (1961)
B.S., South Carolina, 1957.

Trogdon, William Oren, Professor of Agronomy and Head of the Department of Soil and Crop Sciences. (1958)
B.S., Oklahoma State, 1942; Ph.D., Ohio State, 1949.

Truettner, Willard Irving, Professor of Mechanical Engineering. (1930, 1943)
B.S., Michigan, 1928; M.S.E., 1930; Reg. Prof. Engr.

Turk, Richard Duncan, Professor of Veterinary Parasitology and Head of Department. (1944)
D.V.M., Kansas State College, 1933; M.S., Agricultural and Mechanical College of Texas, 1939.

Turney, H. A., Assistant Professor of Entomology. (1958)
B.S., Arkansas, 1952; M.S., 1956.

Vanderzant, Carl, Associate Professor of Dairy Science. (1953, 1957)
B.S., Wageningen, 1947; M.S., 1949; M.S., Iowa State College, 1950; Ph.D., 1953.

Vanderzant, Erma Schumacher, Biochemist of Department of Biochemistry and Nutrition. (1954)
B.S., Iowa State, 1943; Ph.D., 1953.

Varvel, Walter A., Professor of Psychology. (1941, 1945)
A.B., Kansas, 1932; M.A., 1933; Ph.D., 1938.

Vernon, Albert Edward, Major, Associate Professor of Military Science and Tactics. (1961)
B.S., South Carolina, 1938.

Vrooman, Richard, Professor of Architecture. (1949, 1960)
B.A., Oberlin College, 1941; B.Arch, Western Reserve, 1949; M.Arch., Agricultural and Mechanical College of Texas, 1952; Reg. Prof. Arch. (On leave of absence from 9-1-61 to 8-31-63.)

Wagner, William Grant, Assistant Professor of Architecture. (1954, 1956)
B.Arch., Texas, 1949; Reg. Prof. Arch.

Wainerdi, Richard Elliott, Assistant to the Dean of Engineering; Professor of Engineering Science; and Head, Activation Analysis Research Laboratory. (1957, 1959)
B.S., Oklahoma, 1952; M.S., Pennsylvania State, 1955; Ph.D., 1958; Reg. Prof. Engr.

Walden, James Cecil, Assistant Professor of Architecture. (1955, 1960)
B.Arch, Agricultural and Mechanical College of Texas, 1955.

Walker, Jack Vernon, Instructor in Nuclear Engineering. (1960)
B.S., Agricultural and Mechanical College of Texas, 1958; M.S., 1960.

Wallmo, Olof Charles, Associate Professor of Wildlife Management. (1955, 1959)
B.S., Utah State Agricultural College, 1946; M.S., Wisconsin, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Walton, Henry Harrison, Instructor in Health and Physical Education. (1958)
B.S., Northwestern State College, 1957; M.S., 1958.

Wamble, Albert Cecil, Research Engineer of Texas Engineering Experiment Station. (1945)
B.S., Agricultural and Mechanical College of Texas, 1933.

Ward, Robert Page, Professor of Electrical Engineering. (1925, 1943)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Watkins, Gustav McKee, Director of Agricultural Instruction and Professor of Plant Physiology and Pathology. (1949, 1960)
B.A., Texas, 1929; M.S., 1930; Ph.D., Columbia, 1935.

Watson, Charles Richard, Assistant Professor of Architecture. (1961)
B.Arch., Agricultural and Mechanical College of Texas, 1956.

Weaver, James Nevin, Associate Professor of Entomology. (1951, 1957)
B.A., Southwestern, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1953.

Webb, Earl Sherman, Associate Professor of Agricultural Education. (1961)
B.S., Missouri, 1949; M.Ed., 1955; D.Ed., 1959.

Weekes, Donald Fessenden, Professor of Physics. (1937, 1945)
B.S., Middlebury College, 1924; M.A., Amherst College, 1926; Ph.D., Cornell, 1937.

Weihing, Ralph Martin, Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Colorado Agricultural and Mechanical College, 1930; M.S., Nebraska, 1932; Ph.D., 1934.

Weiner, Peter Douglas, Assistant Professor of Mechanical Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., 1961; Reg. Prof. Engr.

Weitzel, Hulbert Frederick, Jr., Captain, Assistant Professor of Air Science. (1958)
B.B.A., Houston, 1949.

Welch, Nathan Edgar, Instructor in Chemical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1956.

Wells, Charles Brinton, Jr., Major, Associate Professor of Air Science. (1959)
A.B.J., Georgia, 1941.

Wells, Ernest Stewart, Instructor in Modern Languages. (1961)
B.A., Brigham Young, 1958.

Whealy, Roger Dale, Professor of Chemistry. (1958)
B.S., Eastern Normal, South Dakota, 1930; M.S., Colorado, 1937; M.S., Oregon, 1948; Ph.D., Colorado, 1953.

White, Robert Frederick, Professor of Landscape Architecture. (1947, 1961)
B.S., Pennsylvania State College, 1934; M.Land., Michigan, 1951.

Whitehouse, Ulysses Grant, Technical Director, Electron Microscope Laboratory and Associate Professor of Biochemistry and Nutrition. (1953, 1961)
B.S., Kentucky, 1940; M.S., 1941; M.S., Iowa, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Whitehurst, Charles Augustus, Instructor in Mechanical Engineering. (1959)
B.S., Louisiana State, 1956; M.S., Southern Methodist, 1959.

Whiteley, Eli Lamar, Associate Professor of Agronomy. (1946, 1959)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., North Carolina State, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Whiting, Robert Louis, Professor of Petroleum Engineering and Head of Department. (1946, 1954)
B.S., Texas, 1939; M.S., 1943; Reg. Prof. Engr.

Whitney, Howard Stephen, Assistant Professor of Agricultural Economics. (1954)
B.S., Oklahoma Agricultural and Mechanical College, 1943; M.S., 1948.

Whitson, Frank Edward, Assistant Professor of Architecture. (1960)
B.Arch, Agricultural and Mechanical College of Texas, 1956; M.Arch., Massachusetts Institute of Technology, 1958.

Whittington, William E., Associate Professor of Business Administration. (1954, 1957)
B.B.A., Texas, 1939; M.B.A., 1947; Ph.D., Illinois, 1957.

Wieder, Russell Karl, Assistant Professor of Health and Physical Education. (1956, 1960)
B.A., Kenyon College, 1942.

Wiening, Victor, Assistant Professor of English. (1952, 1956)
B.A., Valparaiso, 1947; M.A., Louisiana State, 1949.

Wiff, Donald Ray, Instructor in Physics. (1960)
B.S., Capital, 1958; M.A., Kent State, 1960.

Wilkes, Lambert Henry, Associate Professor of Agricultural Engineering. (1957)
B.S., Clemson Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Williams, John Donald, Assistant Professor of Genetics. (1958, 1961)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957; Ph.D., 1961.

Williams, Mack Lester, Instructor in Mathematics. (1955)
B.S., North Texas State Teachers College, 1942; M.S., 1949.

Wilson, Basil Wrigley, Professor of Oceanography. (1953, 1959)
B.S., Capetown, 1931; M.S., Illinois, 1939; C.E., 1940; D.Sc., Capetown, 1953.
(On leave of absence from 4-1-61 to 3-31-62.)

Wingren, Roy Matthew, Professor of Mechanical Engineering. (1928, 1943)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1934; Reg. Prof. Engr.

Wolf, Kenneth, Major, Associate Professor of Air Science. (1959)
B.B.A., Baylor, 1955; M.B.A., Agricultural and Mechanical College of Texas, 1961.

Wood, Norris Philip, Associate Professor of Microbiology. (1955, 1960)
B.S., Hartwick College, 1949; M.S., Cornell, 1951; Ph.D., Pennsylvania, 1955.

Woolket, Joseph John, Professor of Modern Languages and Head of Department. (1925, 1945)
A.B., Oberlin College, 1924; M.A., 1925.

Wooten, Alvin Boyd, Associate Professor of Agricultural Economics. (1960)
B.A., Agricultural and Mechanical College of Texas, 1937; M.S., 1950; Ph.D., 1955.

Worley, Willard Parker, Instructor in Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; Reg. Prof. Engr.

Wright, Samuel Robert, Professor of Civil Engineering and Head of Department. (1923, 1946)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1928; C.E., 1931; Ph.D., 1946; Reg. Prof. Engr.

Wykes, Stanley Allen, Professor of Industrial Engineering. (1947, 1951)
B.S., Pennsylvania State College, 1940; M.S., Virginia Polytechnic Institute, 1946; Reg. Prof. Engr.

Wynes, Charles Eldridge, Assistant Professor of History. (1958, 1961)
B.S., Madison, 1952; M.A., Virginia, 1957; Ph.D., 1960.

Wythe, Landon Douglas, Jr., Assistant Professor of Animal Husbandry. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955.

Yager, Billy Joe, Instructor in Chemistry. (1961)
B.S., Southwest Texas State, 1953; M.S., Agricultural and Mechanical College of Texas, 1960.

Yakura, James Nichio, Assistant Professor of Electrical Engineering. (1961)
B.S., Carnegie Institute of Technology, 1935; M.S., Pittsburgh, 1948.

Young, Mark Francis, Instructor in Veterinary Medicine and Surgery. (1960)
B.S., Utah State, 1955; D.V.M., Iowa State, 1958.

Young, Paul A., Plant Pathologist of Texas Agricultural Experiment Station, Jacksonville. (1935)
B.S., Wabash College, 1921; M.A., Illinois, 1923; Ph.D., 1925.

Yungul, Sulhi. H., Assistant Professor of Geology and Assistant Research Engineer with Texas Engineering Experiment Station. (1960)
B.S., Montana School of Mines, 1943; M.S., California Institute of Technology, 1944.

Zingaro, Ralph Anthony, Associate Professor of Chemistry. (1954, 1959)
B.S., City College of New York, 1946; M.S., Kansas, 1949; Ph.D., 1950.

Zinn, Bennie A., Director of Student Personnel Services. (1945, 1958)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1928.

Zwolinski, Bruno John, Professor of Chemistry. (1961)
B.S., Canisius, 1941; M.S., Purdue, 1943; M.A., Princeton, 1944; Ph.D., 1947.

## RETIRED FACULTY MEMBERS

Adriance, Guy Webb, Professor Emeritus of Horticulture. (1921, 1960)
B.S., Agricultural and Mechanical College of Texas, 1915; M.S., California, 1917; Ph.D., Michigan State College, 1929.

Bagley, John Brewer, Professor Emeritus of Cotton Marketing. (1905, 1947)
B.A., Wake Forest College, 1900.

Bass, James Horace, Professor Emeritus of History. (1940, 1961)
B.A., North Texas State Teachers College, 1924; M.A., Texas, 1931; Ph.D., 1933.

Berry, Raymond Orvil, Professor Emeritus of Animal Husbandry. (1931, 1960)
B.S., North Texas State Teachers College, 1928; M.S., Agricultural and Mechanical College of Texas, 1932; Ph.D., Johns Hopkins, 1939.

Bonnen, Clarence Alfred, Professor of Agricultural Economics. (1937, 1948)
B.S., Illinois, 1920; M.S., 1924.

Boughton, Ivan Bertrand, Professor of Veterinary Pathology. (1948, 1953)
D.V.M., Ohio State, 1916.

Brewer, Alexander Van, Professor Emeritus of Mechanical Engineering. (1922, 1957)
B.S., Purdue, 1913; M.E., 1925; M.S., Agricultural and Mechanical College of Texas, 1937; Reg. Prof. Engr.

Cofer, David Brooks, Professor of English and Archivist Emeritus. (1910, 1957)
A.B., Centre College, 1907; M.A., Wisconsin, 1927.

Darnell, Albert Laurie, Professor Emeritus of Dairy Science. (1914, 1957)
B.S., Mississippi State College, 1914; M.A., Missouri, 1916.

Doak, Clifton Childress, Professor Emeritus of Biology. (1926, 1960)
B.S., North Texas State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1928; Ph.D., Illinois, 1933.

Downard, Richard Walter, Assistant Professor Emeritus of Mechanical Engineering. (1913, 1961)

Dunn, Ralph Clark, Professor Emeritus of Veterinary Bacteriology and Hygiene. (1911, 1950)
D.V.M., Ohio, 1911.

Gammon, Samuel Rhea, Professor Emeritus of History. (1925, 1957)
A.B., Washington and Lee, 1911; M.A., 1913; Ph.D., Johns Hopkins, 1921.

Godbey, Chauncey Barger, Professor Emeritus of Genetics and Statistics. (1926, 1961)
B.S., Kentucky, 1925; M.S., Agricultural and Mechanical College of Texas, 1926.

Gunter, Percy Glyndon, Professor Emeritus of English. (1911, 1955)
A.B., Elon College, 1909; M.A., North Carolina, 1910.

Harter, Edward Lin, Associate Professor Emeritus of Chemistry. (1921, 1959)
A.B., Missouri Wesleyan, 1919; M.A., Kansas, 1927.

Hunt, Robert Lee, Professor Emeritus of Agricultural Economics. (1927, 1961)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., North Carolina State College, 1927; Ph.D., Wisconsin, 1934.

Jones, Beecher Calvin, Assistant Professor Emeritus of Chemistry. (1921, 1947)
A.B., Baylor, 1921; B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1926.

Jones, Fred Rufus, Professor of Agricultural Engineering. (1921, 1940)
B.S., Wisconsin, 1915; M.S., Iowa State College, 1931; Reg. Prof. Engr.

Key, Percy Clark, Associate Professor Emeritus of English. (1924, 1957)
B.A., Texas Christian, 1917; M.A., Vanderbilt, 1918.

Kyle, Edwin Jackson, Dean Emeritus of the School of Agriculture. (1902, 1945)
B.S., Agricultural and Mechanical College of Texas, 1899; B.S.A., Cornell, 1901; M.S.A., 1902; D.Sc., Arkansas, 1941.

Langford, Ernest, Professor Emeritus of Architecture. (1915, 1957)
B.S., Agricultural and Mechanical College of Texas, 1913; M.S., Illinois, 1924; Reg. Prof. Arch.

Leland, Thomas William, Professor Emeritus of Business Administration. (1922, 1961)
B.A., Wisconsin, 1921; M.S., 1922; C.P.A., 1928.

Miller, Horace Otis, Associate Professor of Journalism. (1947, 1948)
A.B., Texas, 1918; M.J., 1920; LL.B., 1928.

Mogford, Joseph Sayers, Professor of Agronomy. (1925, 1937)
B.S., Agricultural and Mechanical College of Texas, 1916; M.S., 1920.

Nelson, Thomas Robert, Associate Professor Emeritus of Mathematics. (1925, 1957)
B.A., East Texas Normal College, 1917; M.A., Texas, 1922.

Overall, John Wayne, Instructor in Physics. (1943, 1951)
A.B., Baylor, 1921; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Porter, Walter Lee, Professor Emeritus of Mathematics. (1918, 1959)
A.B., Howard College, 1911; M.S., Agricultural and Mechanical College of Texas, 1926.

Potts, William McDaniel, Professor Emeritus of Chemistry. (1926, 1958)
B.S., Chicago, 1921; M.S., 1927; Ph.D., 1937.

Reinhard, Henry J., Professor Emeritus of Entomology. (1947, 1960)
B.S., Ohio State, 1915.

Richey, John Jefferson, Professor Emeritus of Civil Engineering. (1912, 1959)
B.S., Illinois, 1903; C.E., 1910.

Rogers, Bruce Allison, Professor of Mechanical Engineering. (1957)
B.S., Iowa State College, 1916; M.S., Chicago, 1920; Ph.D., Harvard, 1933; Reg. Prof. Engr.

Sandstedt, Carl Edward, Professor Emeritus of Civil Engineering. (1923, 1959)
A.B., Leland Stanford, 1910; M.S., Agricultural and Mechanical College of Texas, 1928; Reg. Prof. Engr.

Silvey, Oscar William, Professor Emeritus of Physics. (1916, 1951)
A.B., Indiana, 1907; A.M., 1910; Ph.D., Chicago, 1915.

Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

Summey, George, Jr., Professor Emeritus of English. (1922, 1951)
A.B., Southwestern Presbyterian, 1897; M.A., 1898; Ph.D., Columbia, 1919.

Trotter, Ide Peebles, Dean Emeritus of the Graduate School and Professor Emeritus of Agronomy. (1936, 1960)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918; M.S., 1921; Ph.D., Wisconsin, 1933.

Vezey, Edward Earl, Professor of Physics. (1920, 1952)
B.S., Oklahoma Agricultural and Mechanical College, 1910; M.S., Agricultural and Mechanical College of Texas, 1927.

Wapple, Albert Russell, Instructor in Mathematics. (1942)
B.S., California, 1914; M.A., 1915.

Weaver, Paul, Distinguished Professor of Geology and Geophysics. (1953)
A.B., Columbia, 1908; Reg. Prof. Engr.

Wilcox, George Barton, Professor Emeritus of Education and Psychology. (1920, 1959)
B.S., Sam Houston State Teachers College, 1912; B.S., Agricultural and Mechanical College of Texas, 1923; A.M., Columbia, 1926.

Winkler, Charles Herman, Professor Emeritus of Psychology. (1923, 1946)
B.S., Texas, 1904; M.A., 1914; Ph.D., Missouri, 1916.

Young, Vernon Alphus, Professor of Range and Forestry. (1929, 1946)
B.S., Utah State Agricultural College, 1923; M.S., Iowa State College, 1924; Ph.D., Minnesota, 1929.

## SUMMARY OF THE COLLEGE STAFF AS OF DECEMBER 1, 1961

| | Active | On Leave | Total |
|---|---|---|---|
| College Administrative Officers | 14 | 0 | 14 |
| Full Professors, including Heads of Departments and Divisions | 186 | 6 | 192 |
| Associate Professors | 162 | 6 | 168 |
| Assistant Professors | 149 | 6 | 155 |
| Instructors | 87 | 4 | 91 |
| Other Members of the Academic Council | 6 | 0 | 6 |
| Other Members of the Graduate Faculty | 40 | 0 | 40 |
| Total | 644 | 22 | 666 |

# AGRICULTURAL INSTRUCTION, RESEARCH, EXTENSION AND SERVICES

**R. E. Patterson, Dean of Agriculture**
**The A. and M. College of Texas**
**College Station, Texas**

The land-grant college agricultural team operating at College Station and throughout the State includes agricultural instruction by the School of Agriculture, basic and applied research by the Texas Agricultural Experiment Station, education for adults and youth on the farms and ranches and in the homes by the Texas Agricultural Extension Service.

Agricultural programs involving resident instruction, research, and extension are coordinated in subject-matter departments. The head of each subject-matter department is responsible for the planning and coordination of those areas of activities covered by his department. Heads of departments are responsible directly to the Dean of Agriculture through the Director of Agricultural Instruction for instruction, the Director of the Texas Agricultural Experiment Station for research, and the Director of the Texas Agricultural Extension Service for extension activities. Veterinary research and extension are conducted in the School of Veterinary Medicine under the immediate direction of the School's Dean through the Director of the Texas Agricultural Experiment Station.

Most staff members in the several agricultural departments have dual responsibilities of teaching and research. These, along with extension specialists within a department, are housed together to provide close coordination and cooperation in these activities. In addition to formal instruction to enrolled students, practically all departments and services participate in many specialized short courses and workshops given for adults and youths at College Station and over the State.

The Texas Agricultural Experiment Station also maintains and operates 44 experimental field stations over the State. Research among these locations is coordinated closely with the subject-matter departments and the Main Station at College Station. For administrative purposes, Texas is divided into 12 Extension Service districts, each headed by a district agricultural agent and a district home demonstration agent who supervise the extension programs of the county agents in the district. Associated with the districts and field units are area specialists who are highly trained and experienced in specific problem areas of the district.

Further information on the activities of any department or service may be obtained from its headquarters.

## THE TEXAS AGRICULTURAL EXPERIMENT STATION

**Administration:**

Robert D. Lewis, Ph.D., Director

Roland J. Hildreth, Ph.D., Assistant Director—Programs

Victor E. Schember, M.S., Assistant Director—Business and Fiscal

Alvin A. Price, D.V.M., M.S., Assistant Director—Veterinary Research

Paul J. Lyerly, Ph.D., Research Coordinator, Trans-Pecos Area

**Agricultural Information Office:**

Tad Moses, Agricultural Editor

Herbert O. Evans, B. S., Assistant Editor—News

James W. Potts, M.S., Assistant Editor—News

Helen B. Scott, Assistant Editor—Publications

Mary Grace Wilhelm, B.S., Assistant Editor—Publications

**Agricultural Economics and Sociology:**

Tyrus R. Timm, D.P.A., Professor and Head of Department (Agricultural Policy)

Harley Bebout, M.S., Associate Professor (Marketing)

Robert E. Branson, Ph.D., Professor (Marketing)

C. Harold Brown, Ph.D., Assistant Professor (Sociology)

Charles W. Brown, M.S., Assistant Professor (Marketing)

Dan R. Davis, M. S., Associate Professor (Sociology)

Vance W. Edmondson, Ph.D., Associate Professor (Farm and Ranch Management)

John A. Kincannon, Ph.D., Associate Professor (Marketing)

John G. McNeely, Ph.D., Professor (Marketing)

Aden C. Magee, M.S., Professor (Farm and Ranch Management)

Jarvis E. Miller, Ph.D., Associate Professor (Marketing)

Clarence A. Moore, M.S., Associate Professor (Marketing)

Donald S. Moore, Ph.D., Assistant Professor (Farm and Ranch Management)

Bardin H. Nelson, Ph.D., Professor (Sociology)

Daniel Russell, A.M., Professor (Sociology)

Robert L. Skrabanek, Ph.D., Professor (Sociology)

Houston E. Smith, M.S., Junior Economist (Marketing)

Harold B. Sorensen, Ph.D., Associate Professor (Marketing)

Randall Stelly, Ph.D., Associate Professor (Marketing)

Bob H. Stone, M.S., Junior Economist, Tyler, Texas (Farm and Ranch Management)

Kenneth R. Tefertiller, Ph.D., Assistant Professor (Farm and Ranch Management)

Russell G. Thompson, B.A., Assistant Professor (Marketing)

James M. Ward, M.S., Assistant Professor (Marketing)

Howard S. Whitney, M.S., Associate Professor (Marketing)

Alvin B. Wooten, Ph.D., Associate Professor (Land Economics)

**Agricultural Education:**

Earl H. Knebel, D.Ed., Professor and Head of Department

R. M. Craig, B.S., Associate Professor and Coordinator of the Agricultural Adult Specialist Program

John W. Holcomb, M.Ed., Associate Professor

O. M. Holt, M.Ed., Associate Professor

Henry Ross, M.S., Professor

Earl S. Webb, D.Ed., Associate Professor

Carl G. Anderson, M.S., Associate Professor (Farm Management Specialist)

Joel R. Barton, Jr., B.S., Associate Professor (Machine Specialist)

C. B. Edwards, M.S., Associate Professor (Machine Specialist)

George D. Garretson, B.S., Assistant Professor (Beef Cattle Specialist)

Joel M. Hillin, M.S., Associate Professor (Dairy Specialist)

Robert C. Jaska, M.S., Assistant Professor (Electrical Specialist)

William M. Oliver, M.Ed., Associate Professor (Beef Cattle Specialist)

William B. Thomas, M.S., Assistant Professor (Swine Specialist)

H. A. Turney, M.S., Assistant Professor (Entomology Specialist)

Harold T. Wiedemann, B.S., Associate Professor (Machine Specialist)

**Agricultural Engineering:**

Price Hobgood, M.S., Professor and Head of Department

William H. Aldred, M.S., Assistant Professor (Farm Power and Machinery)

Billy J. Cochran, B.S., Instructor (Farm Power and Machinery)

Charles M. Hohn, M.S., Assistant Professor (Drainage, Irrigation, and Water Control)

Robert C. Jaska, M. S., Assistant Professor (Farm Electrification)

Otto R. Kunze, M.S., Associate Professor (Farm Structures)
(On leave of absence 9-1-61 to 8-31-62.)

William E. McCune, M.S., Professor (Farm Electrification)

Ralph J. McGinty, M.S., Instructor (Farm Structures)

Nat K. Person, Jr., M.S., Instructor (Crop Drying, Storing, and Processing)

Ernest T. Smerdon, Ph.D., Associate Professor (Soil and Water)

Jerome W. Sorenson, Jr., M.S., Professor (Crop Drying, Storing, and Processing)

Billy R. Stewart, M.S., Assistant Professor (Farm Structures)

Dennis R. Stipe, B.S., Instructor (Farm Electrification)

Lambert H. Wilkes, M.S., Associate Professor (Farm Power and Machinery)

**Animal Husbandry:**

Ogbourne D. Butler, Ph.D., Professor and Head of Department

Thomas C. Cartwright, Ph.D., Professor (Animal Breeding)

Stanley P. Davis, Wool and Mohair Technician (Wool and Mohair)

George F. Ellis, Jr., B.S., Assistant Professor (Animal Breeding)

William C. Ellis, Ph.D., Assistant Professor (Ruminant Nutrition)

Harold W. Franke, B.S., Instructor (Beef Cattle)

Fred Hale, M.S., Professor (Swine Nutrition)

John H. Jones, B.S., Professor (Feeding Investigations)

General T. King, Ph.D., Associate Professor (Meats Investigation)

Clifton M. Laywell, B.S., Instructor (Swine)

John T. Morrow, Ph.D., Instructor (Physiology of Reproduction)

John K. Riggs, M.S., Professor ( Beef Cattle Investigation)

Anton M. Sorensen, Jr., Ph.D., Associate Professor (Physiology of Reproduction)

**Biochemistry and Nutrition:**

Carl M. Lyman, Ph.D., Professor and Head of Department (Proteins and Amino Acids)

Bennie J. Camp, Ph.D., Associate Professor (Poisonous Plants)

J. R. Couch, Ph.D., Professor (Poultry Nutrition)

Julius W. Dieckert, Ph.D., Associate Professor

Harriott O. Kunkel, Ph.D., Professor (Large Animal Nutrition, Metabolism)

Carter C. Litchfield, Assistant Professor

John M. Prescott, Ph.D., Professor (Microorganisms Assays, Bacterial Metabolism)

Raymond Reiser, Ph.D., Professor (Fat Metabolism, Insect Nutrition)

Luther R. Richardson, Ph.D., Professor (Vitamins, Requirements, and Utilization)

David Sharon, Instructor

**Dairy Science:**

Isaac W. Rupel, Ph.D., Professor and Head of Department (Dairy Production)

Murray A. Brown, Ph.D., Assistant Professor (Dairy Production)

Rudolph E. Leighton, Ph.D., Professor (Dairy Production)
(On leave of absence 9-1-61 to 8-31-63)

Albert V. Moore, Ph.D., Professor (Dairy Manufactures)

Isaac I. Peters, Ph.D., Associate Professor (Dairy Manufactures)

Carl Vanderzant, Ph.D., Associate Professor (Dairy Manufactures)

**Entomology:**

J. C. Gaines, Ph.D., Professor and Head of Department

Perry L. Adkisson, Ph.D., Associate Professor (Cotton Insects)

Alfred H. Alex, B.S., Associate Professor (Apiculture)

Robert K. Ashby, Foulbrood Inspector

James R. Brazzel, Ph.D., Associate Professor (Cotton Insects)

Claude J. Burgin, B.S., Chief Foulbrood Inspector and State Entomologist (Foulbrood Control)

Horace R. Burke, Ph.D., Assistant Professor (Insect Taxonomy)

Ralph L. Hanna, Ph.D., Associate Professor (Cotton Insects)

Donald R. King, Ph.D., Associate Professor (Pecan and Fruit)

Ronald A. Moeller, B.S., Foulbrood Inspector

Willis L. Owen, Jr., M.S., Associate Entomologist, Lubbock, Texas (Cotton Insects)

Manning A. Price, M.S., Associate Professor (External Parasites)

Neal M. Randolph, M.S., Associate Professor (Legume Insects)

Henry J. Reinhard, B.S., Professor Emeritus (Insect Taxonomy)

Oliver E. Shipp, M.S., Assistant Professor

James K. Walker, Jr., M.S., Assistant Professor (Cotton Insects)

James N. Weaver, Ph.D., Associate Professor (Apiculture)

**Home Economics:**

Sylvia Cover, Ph.D., Professor (Food and Nutrition)

Phyllis Drake, M.S., Assistant Professor (Marketing)

Robert L. Hotstetler, M.S., Instructor (Food and Nutrition)

Sanford J. Ritchey, Ph.D., Assistant Professor (Food and Nutrition)

Alice C. Stubbs, Ph.D., Associate Professor (Marketing)

**Plant Sciences:**

David W. Rosberg, Ph.D., Professor and Head of Department (Plant Pathology)

Jagdish V. Amin, Ph.D., Research Associate (Plant Physiology)

Lee J. Ashworth, Jr., Ph.D., Assistant Professor (Plant Pathology)

Luther S. Bird, Ph.D., Associate Professor (Plant Pathology)

Walter W. Heck, Ph.D., Associate Professor (Plant Physiology)

Howard E. Joham, Ph.D., Professor (Plant Physiology)

F. R. H. Katterman, Ph.D., Assistant Professor (Plant Physiology)

Harry C. Lane, Ph.D., Associate Professor, Lubbock, Texas (Plant Physiology)

Charles S. Miller, Ph.D., Assistant Professor (Plant Physiology)

Page W. Morgan, Ph.D., Assistant Professor (Plant Physiology)

R. G. Reeves, Ph.D., Professor (Genetics)

Walter H. Thames, Jr., Ph.D., Associate Professor (Plant Nematology)

Johannes P. Van Buijtenen, Ph.D., Assistant Professor (Silviculturist)

**Poultry Science:**

John H. Quisenberry, Ph.D., Professor and Head of Department (Poultry Breeding and Administration)

Robert L. Atkinson, Ph.D., Assistant Professor (Turkey Feeding and Breeding)

John W. Bradley, M.S., Farm Superintendent (Poultry Center Operation and Management)

James R. Couch, Ph.D., Professor (Poultry Nutrition)

Ronald E. Davies, Ph.D., Assistant Professor (Poultry Nutrition)

Charles W. Deyoe, Ph.D., Assistant Professor

Bill H. Doran, B.S., Instructor (Random Sample Tests)

George H. Draper, M.S., Poultry Supervisor (National Poultry Improvement Plan)

Roy C. Fanguy, Ph.D., Assistant Professor (Blood Antigens)

Thomas M. Ferguson, Ph.D., Associate Professor (Histopathology)

Frederick A. Gardner, Ph.D., Assistant Professor (Marketing Technology)

Edmond L. Kosarek, B.S., Poultry Supervisor (National Poultry Improvement Plan)

Willie F. Krueger, Ph.D., Professor (Incubation, Breeding, and Population Genetics)

Cecil B. Ryan, M.S., Assistant Professor (Environmental Control)

Joe N. Wakefield, B.S., Poultry Supervisor (National Poultry Improvement Plan)

**Range and Forestry:**

Charles L. Leinweber, Ph.D., Professor and Head of Department (Range Management)

Robert A. Darrow, Ph.D., Professor (Brush Control)
F. W. Gould, Ph.D., Associate Professor and Agrostology Curator
Robert H. Haas, M.S., Assistant Professor (Brush Control)
Donald L. Huss, Ph.D., Assistant Professor (Grazing Management)
Wayne G. McCully, Ph.D., Associate Professor (Grassland Management)
Omer E. Sperry, Ph.D., Professor (Poisonous Range)

**Soil and Crop Sciences:**

William O. Trogdon, Ph.D., Professor and Head of Department

### Agronomy Section

Irvin M. Atkins, Ph.D., Agronomist (Small Grains)
J. H. Barton, B.S., Soil and Water Conservation Specialist
W. F. Bennett, Ph.D., Agricultural Chemist (Soil Laboratory)
S. G. Black, M.S., Associate Cotton Specialist (Cotton)
(On leave of absence.)
Morris E. Bloodworth, Ph.D., Professor (Soil Physics)
Anton J. Bockholt, M.S., Instructor (Corn Breeding)
John Box, B.S., Agronomist (Fertilizers)
Meta S. Brown, Ph.D., Professor (Cotton Cytogenetics)
Augustus G. Caldwell, Ph.D., Associate Professor (Fertility Investigation)
Lee C. Coffey, Ph.D., Professor and Agronomist (Foundation Seed)
Jesse W. Collier, Ph.D., Associate Agronomist (Corn Investigation)
Fred C. Elliott, M.S., Agronomist (Cotton)
John E. Endrizzi, Ph.D., Assistant Professor (Cytogenetics)
Flake L. Fisher, Ph.D., Associate Professor (Fertilizers)
Curtis L. Godfrey, Ph.D., Associate Professor (Soil Classification)
Ethan C. Holt, Ph.D., Professor (Grasses)
George W. Kunze, Ph.D., Professor (Soil Mineralogy)
George G. McBee, M.S., Pasture Specialist (Pastures)
George A. Niles, Ph.D., Assistant Professor (Plant Breeding)
A. C. Novosad, M.S., Seedstocks Operations Manager
Paul E. Pawlisch, Ph.D., Assistant Professor (Cereal Crops)
Lynn P. Pittard, B.S., Assistant Soil and Water Conservation Specialist
Homer E. Rea, B.S., Associate Professor (Weed Control)
Darrell T. Rosenow, M.S., Instructor (Sorghum)
James D. Smith, Ph.D., Assistant Professor (Genetics and Plant Breeding)
Ben R. Spears, M.S., Agronomist (General Agronomy)
Raymond D. Staten, Ph.D., Associate Professor (Legumes)
E. M. Trew, M.S., Agronomist (Pastures)
Eli L. Whiteley, Ph.D., Associate Professor (Soil Management and New Crops)
T. G. White, M.S., Instructor (Cotton Breeding)

### Floriculture Section

A. F. DeWerth, M.S., Professor (Floriculture)

David A. Pate, M.S., Instructor (Floriculture)

### Horticulture Section

Fred R. Brison, M.S., Professor

Homer T. Blackhurst, Ph.D., Professor (Vegetable Breeding and Testing)

Eugene E. Burns, Ph.D., Associate Professor (Processing and Post Harvest Physiology)

Effin T. Graham, Assistant Professor

Bluefford Hancock, B.S., Extension Horticulturist

Hubert C. Mohr, Ph.D., Associate Professor (Vegetable Culture and Breeding)

Donald R. Paterson, Ph.D., Associate Horticulturist (Nutrition, Vegetables, and Fruit)

Durwood E. Speights, B.S., Assistant Professor

James B. Storey, Ph.D., Associate Professor (Fruits and Nuts)

**Farm Service:**

James E. Roberts, M.S., Farm Manager

Freddie A. Wolters, M.E., Superintendent

**Agricultural Analytical Services:**

L. R. Richardson, Ph.D., Professor and Head

Ewing E. Brown, M.S., Research Scientist

Cecil H. Dickson, M.S., Research Scientist (Analytical Chemistry)

**Assistant Director for Veterinary Research:**

Alvin A. Price, D.V.M., M.S., Assistant Director for Veterinary Research and Dean of Veterinary Medicine (Anatomy)

Charles H. Bridges, D.V.M., Ph.D., Professor (Pathology)

**Veterinary Medicine and Surgery:**

Melvin R. Calliham, D.V.M., Professor and Head of Department (Veterinary Medicine and Surgery)

Harold E. Redmond, D.V.M., Professor (Veterinary Medicine and Surgery)

**Veterinary Microbiology:**

Leland C. Grumbles, D.V.M., M.S., Professor and Head of Department (Microbiology)

Lamar H. Carroll, D.V.M., Instructor (Microbiology)

Archie I. Flowers, D.V.M., M.S., Associate Professor (Poultry Pathologist)

Ted E. Franklin, D.V.M., M.S., Associate Professor (Veterinary Microbiology)

Charles F. Hall, D.V.M., M.S., Associate Professor (Poultry Pathologist)

Fred C. Heck, Jr., B.S., Instructor

John W. Huff, D.V.M., Assistant Professor (Veterinary Microbiology)

Chester F. Meinecke, D.V.M., M.S., Assistant Professor (Poultry Pathologist)

Richard W. Moore, D.V.M., M.S., Associate Professor (Veterinary Microbiology)

Kenneth R. Pierce, D.V.M., Assistant Professor (Pathology)

**Veterinary Parasitology:**

Richard D. Turk, D.V.M., M.S., Professor and Head of Department (Veterinary Parasitology)

Rurel R. Bell, D.V.M., M.S., Associate Professor (Veterinary Parasitology)

**Wildlife Management:**

W. B. Davis, Ph.D., Professor and Head of Department (Mammalogy, Herpetology, Ecology)

Richard J. Baldauf, Ph.D., Associate Professor (Fishery, Biology, Herpetology)

Dilford C. Carter, M.S., Instructor (Mammalogy)

Richard B. Davis, Ph.D., Associate Professor (Ecology, Biometry)

Jack M. Inglis, M.S., Instructor (Ecology, Ornithology)

Robert L. Spicer, M.S., Instructor (Ecology)

Olof C. Wallmo, Ph.D., Associate Professor (Ecology, Wildlife Management)

## SUBSTATIONS

**Number 1—Beeville:**

Edward M. Neal, B.S., Superintendent

Lucas Reyes, Junior Agronomist

**Number 2—Tyler:**

Paul R. Johnson, M.S., Superintendent

Shannon E. Carpenter, B.S., Associate Dairy Husbandman

Harry F. Morris, M.S., Horticulturist

Bob H. Stone, M.S., Junior Economist

**Number 3—Angleton:**

James C. Smith, M.S., Superintendent

George E. Cauthen, D.V.M., M.S., Associate Veterinarian

James B. Henson, D.V.M., M.S., Assistant Veterinarian (On leave)

Brook E. Jeter, Jr., M.S., Assistant Agronomist

Marvin E. Riewe, M.S., Associate Agronomist

**Number 4—Beaumont:**

Lloyd E. Crane, Ph.D., Superintendent

Clarence C. Bowling, M.S., Assistant Entomologist

Nathan S. Evatt, M.S., Associate Agronomist

William B. Gay, B.S., Training Consultant

Harry R. Hudgins, M.S., Assistant Agronomist

John E. Scott, M.S., Assistant Agronomist

James W. Stansel, M.S., Assistant Geneticist

Ralph M. Weihing, Ph.D., Agronomist
John R. Wood, M.S., Assistant Agronomist

**Number 5—Temple:**

Richard M. Smith, Ph.D., Superintendent
Lewis E. Clark, M.S., Assistant Agronomist
Elton D. Cook, Ph.D., Agronomist
Ralph J. Hervey, M.S., Assistant Plant Pathologist

**Number 6—Denton:**

Daniel I. Dudley, B.S., Superintendent
James H. Gardenhire, M.S., Assistant Agronomist
Pat A. Rich, M.S., Junior Agronomist
Charles O. Spence, M.S., Associate County Agent and Assistant Agronomist

**Number 7—Spur:**

Paul T. Marion, M.S., Superintendent
William P. Hatchett, B.S., Junior Agronomist
Earl D. Robison, B.S., Assistant Range Specialist
William J. Waldrip, M.S., Assistant Range Specialist

**Number 8—Lubbock:**

Charles E. Fisher, M.S., Superintendent
Donald L. Jones, M.S., Agronomist Emeritus
Robert E. Karper, Ph.D., Agronomist Emeritus
Jack G. King, M.S., Assistant Agronomist
Jack H. Kyle, Ph.D., Assistant Horticulturist
Harry C. Lane, Ph.D., Associate Professor (Plant Physiology) (On leave of absence)
James S. Newman, M.S., Assistant Agronomist (Irrigation)
W. L. Owen, Jr., M.S., Associate Entomologist
Alexander Pope, Ph.D., Agronomist
Levon L. Ray, M.S., Assistant Agronomist
Harvey J. Walker, M.S., Assistant Agronomist
James H. Valentine, Ph.D., Area Soil Chemist

**Number 9—Trans-Pecos:**

**Livestock Unit**

Aurelious A. Melton, M.S., Associate Animal Husbandman

**Soils and Crops Unit**

Earnest L. Thaxton, Jr., M.S., Associate Agronomist

**Number 12—Chillicothe:**

Keith A. Lahr, B.S., Assistant Agronomist

**Number 14—Sonora:**

William T. Hardy, D.V.M., Superintendent
Fred R. Campbell, M.S., Assistant Animal Husbandman
Oscar L. Carpenter, Junior Animal Husbandman
Charles L. Livingston, Jr., D.V.M., Assistant Veterinarian
Leo B. Merrill, Ph.D., Associate Range Management

**Number 15—Weslaco:**

Walter R. Cowley, M.S., Superintendent
Jack C. Bailey, B.S., Junior Entomologist
Charles A. Burleson, M.S., Associate Agronomist
Rumaldo T. Correa, M.S., Assistant Horticulturist
Herbert A. Dean, M.S., Associate Entomologist
Cleveland J. Gerard, Ph.D., Associate Soil Physicist
Jack L. Hubbard, M.S., Associate Agronomist
Paul W. Leeper, M.S., Associate Horticulturist
Norman P. Maxwell, M.S., Associate Horticulturist
J. Neal Pratt, Ph.D., Area Agronomist
Michael F. Schuster, B.S., Assistant Entomologist
Bailey Sleeth, Ph.D., Pathologist
Dan A. Wolfenbarger, Ph.D., Associate Entomologist

**Number 16—Iowa Park:**

Lester E. Brooks, B.S., Superintendent
Virgil I. Woodfin, B.S., Junior Horticulturist

**Number 17—Ysleta:**

Paul J. Lyerly, Ph.D., Research Coordinator Trans-Pecos Area and Superintendent
James J. Hefner, M.S., Assistant Plant Pathologist
D. S. Logan, Jr., B.S., Junior Animal Husbandman
Donald E. Longenecker, Ph.D., Associate Agronomist

**Number 18—Prairie View:**

John C. Williams, M.S., Professor and Superintendent
Roscoe W. Lewis, Ph.D., Professor
Oliver E. Smith, M.S., Associate Professor
Johnnie J. Woods, M.S., Associate Professor

**Number 19—Winter Haven:**

Bruce A. Perry, Ph.D., Superintendent
John M. Creel, Jr., B.S., Assistant Agronomist
James A. Harding, M.S., Assistant Entomologist

**Number 20—Stephenville:**

Byron C. Langley, M.S., Superintendent
Tom E. Denman, B.S., Associate Horticulturist

**Number 21—Gonzales:**

Arthur A. Camp, Ph.D., Superintendent
Hugh T. Cartrite, D.V.M., Associate Poultry Pathologist

**Number 23—McGregor:**

Henry O. Hill, B.S., C.E., Superintendent
William H. Carter, Accountant
Walter E. Kruse, M.S., Assistant Animal Husbandman
Milton J. Norris, M.S., Agronomist
J. Maurice Shelton, Ph.D., Associate Animal Husbandman and Geneticist
Olin J. Tippitt, B.B.A., Farm Superintendent

**Dairy Investigations, Titus County:**

John A. Lancaster, M.S., Associate Agronomist and Project Supervisor

**East Texas Pasture Investigations, Lufkin:**

Elton K. Crouch, B.S., Associate Animal Husbandman, In Charge

**Fruit Investigations, Montague:**

Uriel A. Randolph, M.S., Associate Horticulturist

**Plant Disease Investigations, Yoakum:**

Arthur L. Harrison, Ph.D., Plant Pathologist
Thurman E. Boswell, M.S., Assistant Plant Pathologist

**Poultry Disease Laboratory:**

Robert L. Kilgore, Associate Poultry Pathologist

**Poultry Disease Investigations, East Texas:**

Robert L. Clifford, Jr., D.V.M., Associate Poultry Pathologist

**Texas College of Arts and Industries, Citrus and Vegetable Training Center:**

Percy W. Rohrbaugh, Ph.D., Professor and Project Director
Julius L. Heinis, Ph.D., Assistant Professor
Richard A. Hensz, M.S., Instructor
Robert F. Leyden, Ph.D., Associate Professor
Rex B. Reinking, M.S., Instructor

**Texas Technological College:**

James W. Graves, M.S., Assistant Professor (Agricultural Economics)
Clark Harvey, Ph.D., Professor (Agronomy)

Chester C. Jaynes, M.S., Assistant Professor (Agronomy)
Walter B. Rogers, Ph.D., Assistant Professor

**Tomato Disease Investigations, Jacksonville:**

Paul A. Young, Ph.D., Plant Pathologist

**Big Spring Field Station, Big Spring:**

Earl Burnett, Ph.D., Superintendent (USDA-SWCRD) (Soil Scientist)
Norman H. Welch, M.S., Soil Scientist (USDA-SWCRD)

**U. S. D. A. Southwestern Great Plains Field Station:**

Charles E. Van Doren, B.S., Superintendent (USDA-SWCRD)
Norris E. Daniels, M.S., Associate Entomologist
George F. Ellis, Jr., B.S., Assistant Animal Husbandman
Kenneth B. Porter, Ph.D., Agronomist
Allen F. Wiese, Ph.D., Agronomist

**Blacklands Experimental Watershed, Riesel:**

Ralph W. Baird, M.S., Project Supervisor (USDA-SWCRD)

## THE TEXAS AGRICULTURAL EXTENSION SERVICE

### Headquarters Staff (As of December 1, 1961)

**Administration:**

John E. Hutchison, M.S., Director
J. D. Prewit, B.S., Associate Director
W. N. Williamson, D.P.A., Assistant Director
D. C. Pfannstiel, Ph.D., Assistant Director
Mrs. Florence W. Low, M.S., Assistant Director for Home Economics
Mrs. Gladys D. Kolander, M.S., Home Economics State Home Demonstration Agent
V. G. Young, B.S., State Agricultural Agent
A. H. Walker, M.S., State Agricultural Leader
C. H. Doerge, B.S., Executive Assistant

**Information:**

Tad Moses, Agricultural Editor
Robert H. Cullen, Artist
Herbert O. Evans, B.S., Assistant Editor
R. B. Hickerson, Radio Editor
Mrs. Dorothy Holland, B.S., Assistant Editor—Publications
James S. Hunt, B.S., Assistant Editor—Photography
A. B. Kennerly, M.S., Assistant Editor
Floyd A. Kiker, Artist
Mary Mahoney, B.S., Assistant Editor—Home Economics

Joan Moore, B.F.A., Artist
J. W. Potts, M.S., Assistant Editor
J. T. Sloan, M.S., Visual Aids Specialist
Mary Grace Wilhelm, B.S., Assistant Editor

**Studies and Training:**

Ben D. Cook, Ph.D., Studies and Training Specialist

**Reports:**

Kate Adele Hill, Ph.D., Reports Analyst

**4-H Club:**

Floyd D. Lynch, M.Ed., State 4-H Club Leader
Marshall E. Crouch, B.S., Assistant State 4-H Club Leader
Edward F. Schlutt, Ph.D., Associate State 4-H Club Leader
Peggy Wilsford, B.S., Assistant State 4-H Club Leader
Erma Wines, B.S., Assistant State 4-H Club Leader

**Home Economics:**

Wanda Barkley, M.S., Specialist in Home Management
Rheba Boyles, M.A., Clothing Specialist
Margaret Bracher, M.S., District Agent, District 9
Thelma Casey, B.S., District Agent, District 7
Mrs. Gwendolyne Clyatt, B.S., Specialist in Consumer Marketing Information
Mary Cothran, B.S., District Agent, District 5
Bonnie Cox, M.Ed., Organization Specialist
Maeona Cox, M.S., Foods and Nutrition Specialist
Mrs. Tom Joyce Cunningham, B.S., District Agent, District 4
Fannie Brown Eaton, M.A., Clothing Specialist
Irene Gromatzky, M.A., District Agent, District 12
Graham Hard, Ph.D., Clothing Specialist
Mrs. Annie Mae Hatchett, M.Ed., District Agent, District 11
Fern Hodge, B.S., District Agent, District 3
Mrs. Eloise Johnson, M.A., Specialist in Family Life Education
Mrs. Roberta Johnson, B.S., District Agent, District 6
Annie Lucy Lane, B.S., District Agent, District 8
Louise Mason, M.S., Foods and Nutrition Specialist
Lucille Moore, M.S., Recreation Specialist
Mrs. Doris Myers, B.S., Area Home Management Specialist, Districts 8 and 11
Mrs. Eula Newman, M.H.E.Ed., Specialist in Home Management
Mrs. Minna Perry, B.S., Area Home Management Specialist, Districts 10 and 12
Frances Reasonover, M.A., Foods and Nutrition Specialist
Mary Routh, M.A., Clothing Specialist

Mrs. Aubrey Russell, M.A., District Agent, District 2
Mrs. Elsie Short, M.A., Specialist in Home Management
Charlotte Tomkins, M.Ed., Specialist in Housing and Home Furnishings
Marie Tribble, M.S., Foods and Nutrition Specialist
Johnnie Lou Weatherly, B.S., Area Home Management Specialist, Districts 5 and 9
Leota White, B.S., District Agent
Claudia Williams, M.S., District Agent, District 10
Edith Lois Wilson, B.S., District Agent, District 1

**Agriculture:**

William S. Allen, B.S. Agricultural Engineer
Charles K. Baker, M.S., Economist in Farm Organization
Jack H. Barton, B.S., Specialist in Soil and Water Conservation
Clifton H. Bates, M.S., Farm Management Specialist
Floyd Z. Beanblossom, M.S., Poultry Marketing Specialist
William F. Bennett, Ph.D., Soil Chemist
S. Glenn Black, M.S., Associate Cotton Specialist
John Box, B.S., Assistant Agronomist
David W. Brown, Ph.D., Economist in Management
Reagan V. Brown, M.S., Rural Sociologist
Larry L. Burleson, M.S., Organization Specialist
Russell G. Burwell, B.S., District Agent, District 8
Alfred D. L. Byrd, M.S., Area Farm Management Specialist, District 11
Shannon E. Carpenter, B.S., Area Dairy Specialist
William O. Cawley, M.S., Assistant Poultry Husbandman
Robert G. Cherry, M.A., Economist—Management and Policy
O. B. Clifton, M.S., Program Specialist
Lee C. Coffey, Ph.D., Agronomist
Edwin H. Cooper, B.S., Specialist in Wildlife Conservation
James W. Davis, Jr., B.S., Dairy Specialist
James A. Deer, M.S., Area Entomologist
James S. Denton, Jr., B.S., Area Farm Management Specialist, District 10
Fred C. Elliott, M.S., Cotton Specialist
William H. Friend, B.S., Area Horticulturist
Connie F. Garner, M.S., Associate Entomologist
Joseph M. Glover, Jr., B.S., District Agent, District 10
James A. Gray, M.S., Animal Husbandman
Byron J. Greiman, Ph.D., Area Livestock Specialist
William W. Grisham, Jr., B.S., District Agent, District 1
Billy C. Gunter, B.S., Area Agronomist
Bluefford G. Hancock, M.S., Horticulturist
R. J. Hodges, Jr., B.S., District Agent, District 9

Garlyn O. Hoffman, M.S., Range Specialist
Roy Lee Huckabee, B.S., District Agent, District 7
Thomas K. Hunter, M.S., Area Farm Management Specialist, District 3
Jack E. Jenkins, B.S., Area Farm Management Specialist, District 4
Sidney L. Jenkins, M.S., Area Farm Management Specialist, District 8
John H. Jones, B.S., Animal Husbandman
Welton H. Jones, B.S., District Agent, District 2
Carroll W. Keese, M.S., Agricultural Engineer—Irrigation
Rex Page Kennedy, M.S., Area Farm Management Specialist, District 12
Robert H. Kensing, B.S., Area Farm Management Specialist, District 7
Robert C. Lambe, Ph.D., Area Specialist in Plant Pathology
John E. Larsen, Ph.D., Horticulturist—Vegetables
Ripley S. Loftis, B.S., Area Resource Development Specialist, District 5
George G. McBee, M.S., Pasture Specialist
John G. McHaney, M.S., Economist
Lawrence A. Maddox, Jr., B.S., Animal Husbandman
James I. Mallett, B.S., Area Farm Management Specialist, District 5
Garland R. Marshall, B.S., Resource Development Specialist
Ted Martin, B.S., District Agent, District 4
Archie M. Meekma, M.S., Dairy Specialist
Marshall M. Miller, M.S., Associate Poultry Marketing Specialist
Clarence J. Murphrey, M.S., Area Farm Management Specialist, District 1
Weldon H. Newton, M.S., Assistant Entomologist
Cecil A. Parker, M.S., Farm Management Specialist
Carol M. Patterson, D.V.M., Veterinarian
Lynn P. Pittard, B.S., Assistant Soil and Water Conservation Specialist
Jerold F. Pittman, M.S., Fruit and Vegetable Marketing Specialist
James E. Poore, Assistant District Leader Rodent Control Service
Thomas E. Prater, M.S., Farm Management Specialist
Joseph Neal Pratt, Ph.D., Area Agronomist, Districts 10 and 12
Bobby Joe Ragsdale, M.S., Associate Range Specialist
Beverly G. Reeves, B.S., Cotton Ginning and Mechanization Specialist
Curtis W. Richardson, Ph.D., Area Dairy Specialist
Richard L. Ridgway, Ph.D., Associate Entomologist
Joseph H. Rothe, B.S., District Agent, District 12
Robert Lee Rushing, M.Ed., Area Resource Development Specialist
John J. Seibert, M.S., Area Farm Management Specialist, District 2
Frank W. Sheppard, M.Ed., Resource Development Specialist
David W. Sherrill, B.S., Area Irrigation Specialist, Districts 1 and 2
Raymond D. Siegmund, B.S., District Agent, District 6
James G. Simmons, B.S., District Agent, District 3
Harlan E. Smith, Ph.D., Plant Pathologist
William A. Smith, B.S., Forestry Specialist

Roy W. Snyder, M.S., Meats Specialist
Ben R. Spears, M.S., Agronomist
Charles O. Spence, M.S., Area Agronomist, District 4
Paul R. Stebbins, B.S., Area Farm Management Specialist, District 9
John H. Surovik, B.S., District Agent, District 5
Thomas D. Tanksley, Jr., M.Ed., Animal Husbandman
Charles A. Taylor, B.S., Area Farm Management Specialist, District 6
John G. Thomas, B.S., Area Entomologist
Uel D. Thompson, M.S., Animal Husbandman
Ernest M. Trew, Jr., M.S., Pasture Specialist
Edward Uvacek, Jr., M.S., Livestock Marketing Specialist
James H. Valentine, M.S., Area Soil Chemist
Silver Whitsett, B.S., District Agent, District 11
Benjamin C. Wormeli, M.S., Poultry Husbandman

## THE TEXAS ENGINEERING EXPERIMENT STATION

(This staff listing does not include employees who are also members of the College teaching staff and whose names appear in the General Faculty section of this catalogue.)

F. J. Benson, M.S., Dean of Engineering
G. P. Blevins, B.B.A., Executive Assistant
A. C. Wamble, B.S., Research Engineer
W. W. Meinke, Ph.D., Associate Research Chemist
Stanley P. Clark, B.S., Associate Research Engineer
B. D. Deacon, Ph.D., Associate Research Chemist
J. R. Bradley, B.S., Associate Research Economist
D. Gibbons, Ph.D., Assistant Research Chemist
L. E. Fite, M.S., Assistant Research Engineer
T. H. Chang, Ph.D., Assistant Research Radiobiologist
J. C. Brusse, B.S., Assistant Research Engineer
(On active Military Leave)
C. E. Neelley, B.S., Assistant Research Engineer
R. H. Thompson, B.S., Assistant Research Economist
W. R. Shelton, B.B.A., Assistant Research Economist
H. B. Pace, M.S., Assistant Research Radiobiologist
P. J. A. Zeller, B.S., Assistant Research Engineer
D. Morrison, B.S., Assistant Research Mathematician
A. R. Jennings, M.S., Research Assistant
R. L. Lawson, B.S., Research Assistant
J. T. Lawhon, B.S., Research Assistant
W. J. Harlan, B.B.A., Research Assistant
J. C. Mitchell, B.A., Research Assistant
C. A. Polaski, B.S., Research Assistant

F. W. Smith, M.S., Operations Chief

L. J. Horn, B.S., Engineering Writer

## THE TEXAS ENGINEERING EXTENSION SERVICE

### Administration:

Harold D. Bearden, Director
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Frank J. Konecny, Executive Assistant
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Ernest A. Wentrcek, Administrative Assistant

### Vocational Industrial Teacher Education:

Basil M. Hackney, Teacher Trainer
B.B.A., Baylor, 1940; M.Ed., Agricultural and Mechanical College of Texas, 1951.

Johnnie B. Whiteley, Teacher Trainer
B.S., East Texas State Teachers College, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1957.

Malcolm D. Darrow, Teacher Trainer
B.S., Arizona, 1933.

### Supervisory Development Training:

Leonard K. Jonas, Chief Instructor
B.S., Trinity, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1958.

Vergil B. Clark, Instructor
B.S., Austin Peay College, 1951; M.S., Tennessee, 1953.

William A. Dow, Instructor
B.S., Texas College of Arts and Industries, 1940.

Elmer F. Frede, Instructor

Wesley B. Mansfield, Instructor
B.A., Baylor, 1942; M.A., 1951.

Raymond F. Matthews, Instructor

William H. Poe, Instructor

### Rural Electric Line Crew Training:

Edward W. Kerlick, Chief Instructor

Grayson E. Baker, Instructor

Kirby N. Jackson, Instructor

Billy Jack Jones, Instructor

Kenneth E. Rogers, Instructor

Troy S. Watson, Instructor

### Water and Sewage Works Training:

Ivan I. Ronhovde, Chief Instructor

James R. Bryan, Instructor

James A. Wilson, Instructor

William A. Mixon, Instructor
B.S., North Texas State College, 1952.

**Instructional Materials Service:**

D. Bart Phipps, Instructional Materials Writer for Piping Trades

P. Albert Washer, Instructional Materials Writer for Petroleum Refining Industry
B.S., Colorado School of Mines, 1926.

**Municipal Electric Employee Training:**

Edward F. Nauert, Instructor

**Police Training:**

Wallace D. Beasley, Chief Instructor
B.S., Abilene Christian College

Edwin E. Powell, Instructor
B.A., Hardin-Simmons, 1932

David C. Betts, Instructor

**Firemen Training:**

Henry D. Smith, Chief Instructor

James A. Bland, Instructor

James R. Dobson, Instructor

John R. Rauch, Instructor

Tom W. Robinson, Instructor

Paul R. Williams, Instructor

**Heavy Construction Equipment Technicians and Operators School:**

Anthony L. Kramer, Chief Instructor

Charlie W. Brannan, Instructor
B.S., LeTourneau Technical Institute, 1949.

Alvin W. Jones, Instructor
B.S., North Texas State Teachers College, 1952.

LaRue W. Jones, Instructor

## THE TEXAS TRANSPORTATION INSTITUTE

(This staff listing does not include employees who are also members of the College teaching staff and whose names appear in the General Faculty section of this catalogue.)

F. J. Benson, M.S., Executive Officer

G. P. Blevins, B.B.A., Executive Assistant

F. H. Scrivner, B.S., Research Engineer

R. N. Traxler, Ph.D., Research Engineer

C. V. Wootan, M.S., Associate Research Economist

H. G. Meuth, B.S., Research Assistant

C. R. Haning, M.B.S., Research Assistant

J. L. Buffington, M.S., Research Assistant

H. A. Richards, M.S., Research Assistant

J. R. Ginn, B.S., Research Assistant

# THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

In his address at the opening of the college on October 4, 1876, Governor Richard Coke, first Chairman of the Board of Directors, outlined the following basic philosophy on which this college was founded and on which it has grown:

> "The aim and mission of the Agricultural and Mechanical College of Texas is, while preparing the young men of Texas for the high duties of American citizenship, at the same time to train their intelligence in the methods and appliances of science, and their hands for the skills which shall utilize them in the every day pursuits of life . . . "

For 86 years the College has offered to young men superior opportunities for educational development while at the same time remaining dedicated to the principles of the original founders as expressed by Governor Coke:

> "It has been the constant aim of the board . . . to bring down to the lowest possible figure the cost of an education which shall be at the same time thorough, liberal, and practical . . . "

From its small beginning with six students and a faculty of six professors in 1876, the Agricultural and Mechanical College of Texas has been built into one of the great technical schools of the nation, offering classroom training coordinated with the various extension and research centers established on its campus. Each year over 7,000 young men live on its campus; attend its classes; work in its shops, agricultural centers, and laboratories; study in its libraries; participate in its excellent ROTC program; play in its nationally recognized intramural program; and benefit from the many cultural activities, including religious, of the campus and the community. To them it offers broad opportunities for learning a profession and for developing into men capable of thinking intelligently and reasonably so that they can contribute to the growth of a more enlightened society.

## HISTORICAL SKETCH

The Agricultural and Mechanical College of Texas, like the land grant institutions in other states of the Union, owes its origin to the Morrill Act, which was approved by Congress July 2, 1862. This act provided for the donation of a specified amount of public lands to the several states and territories. Proceeds from the sale of these lands were to constitute a perpetual fund, the principal of which should remain forever undiminished. The interest from this fund was to be used for the support of at least one technological college whose objective must be, without excluding other scientific and classical studies and including military tactics, to teach branches of learning pertaining to agriculture and mechanic arts in order to promote the liberal and practical education of the industrial classes in the various pursuits and professions of life. The Legislature of Texas accepted the provisions of the congressional legislation in 1866, and $174,000 was realized from the sale of lands set aside under the Act. Before the College opened, this fund had grown to $209,000 through the addition of accrued interest.

In April, 1871, the Legislature provided for the establishment of the Agricultural and Mechanical College. A commission created for the purpose of locating the college accepted the offer made by the citizens of Brazos County and located the institution on a tract of 2,416 acres of land in that county. The College was formally opened and instruction began on October 4, 1876. Its educational activities have been enlarged as the need for such expansion became evident. At the present time both undergraduate and graduate instruction are offered not only in the fields of agriculture and engineering but also in liberal arts, science, education, business administration, and veterinary medicine.

## LOCATION

The community of College Station has grown around the Agricultural and Mechanical College of Texas. This town boasts of churches representing the leading denominations, an excellent public school system, and adequate shopping districts to serve its citizens. Nearby Bryan supplements these advantages.

College Station is located 100 miles north of Houston, 100 miles east of Austin, and 170 miles south of Dallas. State highways, Greyhound Bus Lines, and Continental Airlines serve to connect College Station with the rest of the state. Easterwood Field, the College airport, is located approximately two miles from the Campus.

## ACCREDITATION

The Agricultural and Mechanical College of Texas is accredited by the Southern Association of Colleges and Secondary Schools, the Association of Texas Colleges and Universities, and the Texas Education Agency. The curricula in architecture are accredited by the National Architectural Accrediting Board, and the veterinary medicine degree program is accredited by the American Veterinary Medical Association Council on Education. All of the undergraduate engineering curricula leading to a degree are accredited by the Engineers' Council for Professional Development. Other accrediting agencies which have approved programs offered at the College are the American Chemical Society and the American Council on Education for Journalism.

## BUILDINGS AND FACILITIES

The purchase from time to time of additional land adjacent to the original tract has increased the land owned by the College in Brazos County to approximately 5,200 acres. Additional holdings include a 3,192-acre plantation in Burleson County used for experimental purposes and 411 acres in Kimble County for the Junction Adjunct of the Agricultural and Mechanical College of Texas.

The physical plant of the college includes buildings with a total valuation of approximately $30,000,000. Included among these buildings are the Nuclear Science Center, the Data Processing Center, the Memorial Student Center, the Cushing Memorial Library, the Gibb Gilchrist Engineering Library, the Richard Coke Building, the G. Rollie White Coliseum, the All Faiths Chapel, the auditorium, hospital, Y.M.C.A., supply store, office buildings, numerous classroom buildings with laboratory and research facilities for the various departments, and many barns providing facilities for handling the various classes of livestock used in demonstration and laboratory work in the Schools of Agriculture and Veterinary Medicine. Recent additions include the W. T. Doherty Petroleum Engineering Building, the Nuclear Science Center, the Plant Sciences Building, new wings added to the Physics Building and to the ROTC Building; and the remodeling and air conditioning of several of the older buildings on the campus. New facilities for the Division of Architecture are to be completed soon. Twenty-three dormitories are located conveniently on the campus, and two dining halls are in operation. In addition to dormitories for single students, the College operates 776 apartments for married students in areas near the campus.

Athletic facilities consist of a stadium, field house and natatorium, baseball diamond and bleachers, golf course, and numerous tennis courts and practice fields. A new outdoor swimming pool is under construction.

The value of the physical plant has grown to approximately $54,000,000 and a good foundation has been laid at the College for instruction, for investigation, and for extension by means of financial aid secured from both the Congress and the State Legislature.

## SCHOOLS AND DEPARTMENTS

Academic training at the Agricultural and Mechanical College of Texas is supervised by the Schools of Agriculture, Arts and Sciences, Engineering, Military Sciences, Veterinary Medicine, and the Graduate School. The School of Veterinary Medicine is a degree-granting school, admission to which is obtained only after completion of the program in pre-veterinary medicine and selection within the quota to be admitted for the session under consideration. The ROTC program is under the supervision of the School of Military Sciences. The Graduate School assists graduate students in developing and pursuing individual educational programs. More detailed information concerning its administration and the degrees which may be earned will be found in the Bulletin of the Graduate School.

For administrative purposes the 47 departments and divisions of instruction are assigned to the several schools as follows:

**School of Agriculture**

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Animal Husbandry
Biochemistry and Nutrition
Dairy Science
Entomology
Plant Sciences
Poultry Science
Range and Forestry
Soil and Crop Sciences
Wildlife Management

**School of Arts and Sciences**

Biology
Business Administration
Chemistry
Economics
Education and Psychology
English
Geography
Health and Physical Education
History and Government
Journalism
Mathematics
Modern Languages
Oceanography and Meteorology
Physics

**School of Engineering**

Aeronautical Engineering
Architecture
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Graphics
Geology and Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Nuclear Engineering
Petroleum Engineering

**School of Military Sciences**

Air Science
Military Science and Tactics

**School of Veterinary Medicine**

Veterinary Anatomy
Veterinary Medicine
  and Surgery
Veterinary Microbiology
Veterinary Parasitology
Veterinary Pathology
Veterinary Physiology
  and Pharmacology
Veterinary Public Health

## LIBRARY FACILITIES

**Cushing Memorial Library:** The main College library, which serves also as the research library of the Texas Agricultural Experiment Station and of the Texas Agricultural Extension Service, is in a centrally located, air conditioned building housing a collection of over 317,000 volumes of books, periodicals, government documents, and other library materials.

The library is a federal depository for United States government documents on a selective basis. Over 2,500 periodicals and other serials are currently received, along with 53 state, national, and foreign newspapers. Special attention has been given to obtaining important foreign language periodicals in all areas. Although the library has been developed chiefly along reference and technical lines, a good general reading collection has been assembled. Generous contributions from A. and M. Mothers' Clubs throughout the State have been used to increase substantially the collection of fiction and non-technical popular material. The careful selection of new books in both technical and non-technical areas keeps the collection abreast of modern thought. A well-trained staff of librarians is on duty at all times.

The more important reference works, including indexing and abstracting services, are shelved in the General Reference Room, second floor. Specialized reference materials in science and agriculture are shelved in the Science and Agriculture Reference Room on the same floor. State and federal documents are to be found in the Documents Division, third floor. Microfilm and microcard machines are provided for reading materials in this form.

Individual study carrels are provided in the bookstacks for the use of graduate students and faculty members and may be assigned on a semester basis. With the exception of periodicals, government documents, and certain books temporarily reserved by departments for reference or required reading, all books are loaned for home use for a period of two weeks with the privilege of renewal for the same length of time. Bound volumes of periodicals may be charged out by graduate students for over-night use only.

Normally the library is open from 8 a.m. to 10 p.m., Monday through Friday; Saturday, from 8 a.m. to 12 noon; and Sunday, from 2 p.m. to 10 p.m. On holidays and between terms, the library is open from 8 a.m. to 5 p.m. on weekdays, from 8 a.m. to 12 noon on Saturdays, and is closed on Sundays.

**Texas Engineers Library:** This special branch library, established in 1941 by the Texas State Board of Registration for Professional Engineers in cooperation with the Agricultural and Mechanical College of Texas, is housed in the Gibb Gilchrist Engineering Library Building adjacent to the main college library. The collection consists of over 70,000 volumes of books, periodicals, and other library materials in all areas of engineering. The collection is well balanced but is especially strong in aeronautics, air-conditioning, highway engineering, concrete, hydrology, sanitary engineering, petroleum, and welding. Over 1,400 periodicals and other serials are currently received, including many in foreign languages and some English translations of Soviet technicial journals. The library is a depository for all unclassified technical reports of the Atomic Energy Commission.

The library is modern and well-lighted with stacks open to the public. It is open from 8 a.m. to 9 p.m. on weekdays and on Saturdays from 8 a.m. to 12 noon. The library is closed on Sundays.

**Veterinary Library:** This branch library is located at the east end of the first floor of the Veterinary Medicine Building and is open from 8 a.m. to 10 p.m. on weekdays, and from 8 a.m. to 12 noon on Saturdays. The library is closed on Sundays. It is primarily a reference library with 9,500 volumes of books and periodicals in the fields covered by the curriculum in the School of Veterinary Medicine. The library subscribes to 410 American and foreign periodicals and receives pertinent publications from other colleges and experiment stations.

**Architecture Library:** This branch library, located on the fourth floor of the Academic Building, furnishes reading room space and offers reference service from 8 a.m. to 5 p.m. daily and from 7 p.m. to 10 p.m. Tuesdays and Thursdays. It is closed Saturdays and Sundays. The collection, numbering over 4,600 volumes of carefully selected books and periodicals, provides materials in this specialized field for both students and faculty.

**Business Administration Library:** Another branch of the College Library, this collection consists of 4,000 volumes of books and periodicals in the many areas of business administration, such as accounting, insurance, marketing, business law. Over 153 periodicals are currently received and a file of annual reports of corporations is carefully maintained. The library is located in the west end of the first floor of Francis Hall. It is open from 8 a.m. to 5 p.m. weekdays and is closed Saturdays and Sundays.

**Chemistry Library:** This newest branch library, housed on the fourth floor of the Chemistry Building, consists of a collection of 2,100 volumes of books and periodicals which have been carefully selected for their value as reference material for chemistry. The library is open from 8 a.m. to 5 p.m. and from 7 p.m. to 10 p.m. on weekdays. It is closed on Saturdays and Sundays.

**Other Libraries:** Many departments maintain working collections of books and periodicals for use within the departments. Some of the collections are fairly large and well organized; others are small but very well chosen. Use of these libraries is restricted by the departments concerned.

### THE SUMMER SESSION

The Agricultural and Mechanical College of Texas conducts a summer session consisting of two terms of six weeks each for the benefit of both graduate and undergraduate students.

During the summer session courses are offered in most of the departments and are selected to meet the needs of the regular college students. Emphasis is also placed on planning a program for teachers and administrators who wish to do advanced work. A number of departments offer sufficient work for the Master's degree to be earned by attendance during the summer months. Instruction during the summer session is given by members of the A. and M. College faculty and by teachers of prominence from other institutions.

The Agricultural and Mechanical College of Texas is not a coeducational institution. Under present regulations, however, ladies are permitted to attend the summer session as special students, not candidates for degrees.

A separate catalogue for the summer session giving course offerings and other pertinent information is published each spring and is available on request from the Office of the Director of Admissions.

## ADMISSION

### APPLICATION FOR ADMISSION

Any person who desires to apply for admission to the College should write to the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. The applicant should complete the form according to the directions printed thereon and return it to the Admissions Office. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript from each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school attendance only. It is extremely important that these credentials be submitted in advance of registration. If this cannot be done, the applicant should bring them at the opening of the session. Without the credentials the applicant cannot be admitted, and valuable time will be lost if he has to send for them after arriving at the College.

When admission requirements have been satisfied, the Director of Admissions will then send the applicant a letter of acceptance, a room reservation card, and a physical examination form to be filled out by a physician. The physical examination report must be completed and returned to the Admissions Office prior to the date of registration for classes.

All applicants for admission to the College must be of good moral character, at least sixteen years old, and free from contagious or infectious diseases. Since the Agricultural and Mechanical College of Texas is not a coeducational institution, only men are admitted to the regular session.

A high school student who is eligible for admission to college and who wishes to enter during the summer may well consider the opportunities of combining study and recreation at the Junction Adjunct of the Agricultural and Mechanical College of Texas. Excellent studying, living, and recreational facilities are available at this beautiful Kimble County campsite in the heart of the Texas hill country. Application blanks for admission to the Adjunct may be obtained from the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas.

## METHODS OF ADMISSION

**Of High School Graduates:** An applicant must have graduated from a properly accredited secondary school with a minimum of 15 units (credits) acceptable to the College for entrance purposes. Superior students with unit deficiencies will be considered on the basis of their merit. The applicant who does not meet the above requirement or who falls within the lowest one-fourth of his high school class may be required to make a satisfactory showing on tests prescribed by the College. Generally this means tests given by the College although results of College Entrance Examination Board tests will be acceptable for this purpose.

The 15 acceptable entrance credits shall include four units in English, two units in the social sciences, two units in algebra, one unit in plane geometry, one unit in a natural science, and five acceptable elective units. It is recommended that the five elective units include additional courses from the following subject areas: foreign languages, mathematics, natural sciences, social sciences, and speech. Applicants for admission to engineering and the natural sciences curricula must present trigonometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Such applicants are also strongly advised to present one-half unit in solid geometry. Three units in English and two units in a foreign language may be substituted for the four units required in English. Applicants are advised to take biology, chemistry, or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

A maximum of three units from the following subject areas may be used as a part of the elective credits:

| SUBJECT | UNITS | SUBJECT | UNITS |
|---|---|---|---|
| Advanced Mathematics | ½ | Drawing | 1 to 3 |
| Agriculture, General | 1 | Distributive Education | 2 |
| Agriculture, Vocational | 1 to 3 | Home & Family Life | ½ to 1 |
| Art | 1 | Home Making | ½ to 1 |
| Business Arithmetic | ½ to 1 | Journalism | 1 |
| Bible | ½ to 1 | Junior Business Training | 1 |
| Bookkeeping | ½ to 1 | Music | 1 |
| Commercial Geography | ½ | Typing | ½ to 1 |
| Commercial Law | ½ | Shopwork | 1 to 3 |

**By Examination:** Any or all of the scholarship requirements for admission may be met by passing the entrance examinations. These will be held at the beginning of each semester under the supervision of the College authorities and will cover all the subjects required or accepted for admission as outlined above. Candidates desiring to take examinations at the College should notify the Director of Admissions well in advance of registration.

**By Individual Approval:** An applicant over twenty-one years of age who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted without examination, subject to the following requirements:

1. He must make application on the official entrance blanks.

2. He must furnish evidence that his preparation is substantially equivalent to that required of other applicants and that he possesses the ability and seriousness of purpose necessary to pursue his studies with profit to himself and to the satisfaction of the College.

3. He must show by a test in composition that he has an adequate command of the English language.

4. The candidate should forward his credentials to the Director of Admissions in advance of his coming, but in no case will he be admitted without a personal interview.

A student admitted by individual approval will not be considered a candidate for a degree until he has satisfied the entrance requirements in full.

**Of Superior Students:** Any superior student, as indicated by his entrance tests and his high school record, who presents evidence of outstanding preparation in any subject matter field may be relieved of the introductory course in that field and permitted to substitute another course with the approval of the dean of his school provided he passes a validating examination in the course with a grade of C or better.

**Of College Transfer Students:** Admission to advanced standing may be granted to an applicant who has satisfied the requirements as outlined below:

An applicant who has attended another college or university must be eigible to return to that institution and also must have for each of the last two semesters, or for the total record if less than two semesters of attendance, a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

On the basis of these credentials, credit will be given for work completed with a grade of C or better, so far as the work is equivalent in character and extent to similar work at A. and M. College. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory. Work completed with a grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the subject area.

An applicant whose record does not meet the minimum admission requirements may be considered upon merit after the student has shown satisfactory performance on tests administered at this college.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

**Of Special Students:** A limited number of young men over twenty-one years of age may be admitted to the College as special students, not candidates for a degree, subject to the following regulations:

1. The applicant must show good reason for not taking a regular course and must submit satisfactory evidence that he is prepared to profit by the special studies he wishes to pursue.

2. Record of his previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) his experience; (2) a plan of study, enumerating the courses he desires to pursue; and (3) the purpose or end expected to be accomplished by his study.

3. In order to be admitted to the work of any department, a special student must secure the consent of the head of the department; and his course of study as a whole must be approved by the dean concerned.

Special students are subject to the rules and regulations governing regular students.

A special student who may desire to become a candidate for a degree must satisfy the entrance requirements and obtain the consent of the dean concerned.

**Of Nonresident Students:** A limited number of nonresident students who have attended another college or university may be accepted so long as facilities are available. Such students must have maintained a grade point ratio of 1.00 (C-average) or better on all courses undertaken in addition to a grade point ratio of 1.00 (C-average) or better for each of the last two semesters.

A limited number of out-of-state high school graduates may be accepted so long as facilities are available. Such students, in addition to satisfying all other admission requirements, must have made superior records in high school.

Students who are admitted to the College in one curriculum may not be permitted to change to another which is restricted except under the same conditions as apply to new students.

The status of the residence of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. as a student. His residence may not thereafter be changed by him, but, in the case of a minor, it may be changed by his parents, should they move to and become legal residents of the State and maintain such residence for at least one calendar year.

### REGISTRATION

Every student is required to register when he first enters the College and thereafter at the beginning of each semester. Dates of registration for the session of 1962-63 are shown on pages 2-3 of this catalogue.

Registration is not complete until the student pays his fees for the ensuing semester; reports, if not a civilian student, to ROTC headquarters for assignment to an organization; reports to the Chief of Housing for assignment to a room or to report his place of residence if not living in a dormitory; and returns his assignment card, properly approved, to the Registrar's Office, where his receipt showing payment of fees will be stamped "Registered in the Registrar's Office."

## EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students the total cost should range between $950.00 and $1150.00. In general these amounts include four types of expenses: fees payable to the College Fiscal Department as shown below; textbooks and supplies; clothing, and military uniform to supplement that furnished by the college; and incidental expenses, estimated to range between $100.00 and $200.00 depending upon the individual concerned.

The total expenses for returning students during a regular session should be somewhat less than those amounts indicated for new students.

The fees for board, room, and laundry listed for the session of 1962-63 may be changed during the year if economic conditions make it absolutely necessary.

Fees payable to the Fiscal Department:

| | First Semester to Begin Sept. 14, 1962 | Second Semester to Begin Feb. 1, 1963 |
|---|---|---|
| Tuition (See Note 4) | $ 50.00* | $ 50.00* |
| Student Services (See page 81) | 18.00 | 18.00 |
| Property Deposit | 10.00 | |
| Student Activities (See page 81) | 23.80 | |
| Board (Includes Sales Tax) | 180.54 | 177.48 |
| Room Rent | 67.50 | 60.50 |
| Laundry | 17.41 | 17.27 |
| Room Key Deposit, returnable | 1.00 | |
| Total payable to Fiscal Dept. | $368.25† | $323.25† |
| Textbooks and supplies are variable with classes and courses — about | 40.00 | 30.00 |
| Total general expenses — about | $408.25 | $353.25 |

All fees are payable in full at the beginning of the semester except board, room rent, and laundry; these fees may be paid in installments as shown below. The last three installments for each semester are due on the dates shown below; the fees for delayed payments shall be $1.00 per day extra for each day of delayed payment of fees for board, room rent, and laundry or for any one of these fees. Students who are delinquent five days will be dropped from the rolls.

All members of the cadet corps living in the dormitories are required to pay for board, room rent, and laundry. Students living in the dormitories who are not members of the cadet corps are required to pay the fees for room rent and laundry; board is optional. Changes from dormitory student to day student will be made only on the last day of installment payments for board, room, and laundry.

INSTALLMENT PAYING: The general expenses listed above may be paid in installments as follows:

**FIRST SEMESTER**

1. First installment, payable on entrance, September 15-16
   To Fiscal Department:

| | |
|---|---|
| Tuition (See Note 4) | $ 50.00* |
| Student Services (See page 81) | 18.00 |
| Property Deposit | 10.00 |
| Student Activities (See page 81) | 23.80 |
| Board through October 19 | 55.08 |
| Room Rent through October 19 | 18.00 |
| Laundry through October 19 | 5.12 |
| Room Key Deposit, returnable | 1.00 |
| Total payable to Fiscal Department | $181.00† |
| Textbooks and supplies, variable with classes and courses — about | 40.00 |
| General expenses, first installment — about | $221.00 |

2. Second installment, payable October 1-19
   To Fiscal Department:

| | |
|---|---|
| Board through November 20 | $ 48.96 |
| Room Rent through November 20 | 16.00 |
| Laundry through November 20 | 4.64 |
| Total payable to Fiscal Department | $ 69.60 |

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*The tuition fee for nonresident students is $200.00 per semester.

†**In addition to the expenses as outlined,** the following fees apply:
Laboratory fee from $2.00 to $8.00 per laboratory course; physical education service fee of $8.00 for those students enrolled in required physical education courses; ROTC uniform handling fee of $8.00 for those students enrolled in military or air science.

3. Third installment, payable November 1-20
To Fiscal Department:

| | |
|---|---|
| Board through December 19 (Thanksgiving recess excluded) | $ 38.25 |
| Room Rent through December 19 | 14.50 |
| Laundry through December 19 | 4.10 |
| Total payable to Fiscal Department | $ 56.85 |

4. Fourth installment, payable December 1-19
To Fiscal Department:

| | |
|---|---|
| Board through January 26 (Christmas recess excluded) | $ 38.25 |
| Room Rent through January 26 | 19.00 |
| Laundry through January 26 (Christmas recess excluded) | 3.55 |
| Total payable to Fiscal Department | $ 60.80 |
| Total general expenses, first semester | $408.25 |

## SECOND SEMESTER

1. First installment, payable on entrance, February 1-2, 1963
To Fiscal Department:

| | |
|---|---|
| Tuition (See Note 4) | $ 50.00* |
| Student Services (See page 81) | 18.00 |
| Property Deposit | |
| Student Activities (See page 81) | |
| Board through March 12 | 61.20 |
| Room Rent through March 12 | 20.00 |
| Laundry through March 12 | 5.70 |
| Total payable to Fiscal Department | $154.90† |
| Textbooks and supplies, variable with classes and courses — about | 30.00 |
| General expenses, first installment — about | $184.90 |

2. Second installment, payable March 1-12
To Fiscal Department:

| | |
|---|---|
| Board through April 17 (Spring recess excluded) | $ 47.43 |
| Room Rent through April 17 | 18.00 |
| Laundry through April 17 | 5.12 |
| Total payable to Fiscal Department | $ 70.55 |

3. Third installment, payable April 1-17
To Fiscal Department:

| | |
|---|---|
| Board through May 10 | $ 35.19 |
| Room Rent through May 10 | 11.50 |
| Laundry through May 10 | 3.31 |
| Total payable to Fiscal Department | $ 50.00 |

4. Fourth installment, payable May 1-10
To Fiscal Department:

| | |
|---|---|
| Board through June 1 | $ 33.66 |
| Room Rent through June 1 | 11.00 |
| Laundry through June 1 | 3.14 |
| Total payable to Fiscal Department | $ 47.80 |
| Total general expenses, second semester | $353.25 |

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*The tuition for nonresident students is $200.00 per semester.

†In addition, the amounts shown in Note †, page 75, if applicable.

## ADDITIONAL EXPENSES FOR NEW STUDENTS

In addition to the general expenses shown above, new students will have the following expenses when registering for the first time:

| | |
|---|---|
| Uniform (See Note 1.) — about | $ 80.00 |
| Slide rule and drawing instruments for engineering students (See Note 3.) | $35.00 to 40.00 |
| For new students registering the second semester, February 1, 1963, extra for books and supplies — about | 10.00 |
| For new students who report for the first semester on September 12 for New Student Program, add: | |
| Board | 3.00 |
| Room Rent | 1.00 |
| Laundry | .30 |

NOTES: 1. Members of the ROTC will be furnished most of their uniform equipment. Cadets will find it necessary to supplement the uniform issued by purchasing the following articles, the approximate cost of which at the College Exchange Store is as follows: one pair of wool elastique O.D. pink trousers ($21.95); two pairs of cotton khaki trousers ($5.95 each); collar ornaments ($2.00); two cotton khaki officer style shirts ($5.45 each); one wool elastique garrison cap ($2.95); one cotton khaki garrison cap ($1.25); and four pairs of black cotton socks ($0.85 per pair). Cadets will pay a handling charge of $8.00 per year to cover the cost of issuing, receiving, and record keeping of uniforms issued. Since only approved articles of uniform may be worn, new students should purchase uniforms after arrival at the College.

To defray the cost of additional billing and delayed handling, a charge of ten per cent of the value of uniform articles turned in subsequent to five days following the close of school, with a minimum charge of $1.00, will be made.

The College operates a store for the purpose of supplying necessary articles to students. The store carries in stock textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area. Upon recommendation of the Exchange Store Advisory Board, any profit created from the operation of the Exchange Store may be used for student welfare and other purposes of benefit to the entire student body.

2. The College will furnish the necessary physical education uniform, except shoes, to all students taking required physical education and to others who wish to use facilities of the Physical Education Department. All such students will be required to pay a handling charge of $8.00 per semester for this service. The handling charge includes the cost of laundering the physical education uniform after each use. Each student will be required to furnish his own shoes (1 pair, canvas, rubber sole). These may be purchased at the College Exchange Store for $5.95.

3. The slide rule is one of the most important time-saving instruments of engineers. For use throughout the college course the LL Decitrig Duplex is suggested. Such a rule costs about $23.75. The cost of the drawing instruments needed by engineering students will range from $9.95 to $12.50 depending on quality.

4. For tuition fee of nonresident students, see paragraph below. Former students who in either semester do not register on the days set apart for that purpose pay an additional tuition fee of $4.00.

5. New students, or former students not in school during the preceding semester, may file room reservation applications beginning June 16 for the first semester; October 16 for the second semester. Each application for a dormitory room reservation must be accompanied by a deposit which will apply on the room rent payable on entrance and for the key deposit. Appli-

cation blanks for room reservations will be furnished by the Director of Admissions.

## DAY STUDENTS

Day students pay all specified fees and charges except board (optional), laundry, room rent, and room key deposit.

## PART-TIME STUDENTS

The tuition fee for students registering for less than 12 credit hours will be reduced by $4.00 for each credit hour less than 12 with a minimum tuition fee of $15.00

## NONRESIDENT STUDENTS

In accordance with the regulations of the governing board of the College, the following definitions, general policies, and regulations will apply to nonresident students. Any variance therefrom will depend upon the facts in the individual case and the interpretations placed thereon by the admissions officer.

The residence status of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. College as a student except as provided by law. This policy shall apply to both graduate and undergraduate students regardless of any scholarships, student assistantships, or graduate assistantships that may be granted to any student.

In compliance with the State law, the tuition fee for nonresident students is $200.00 per semester. A nonresident student is hereby defined to be a student of less than twenty-one years of age, living away from his family and whose family resides in another state, or whose family has not resided in Texas for the twelve months immediately preceding the date of registration; or a student of twenty-one years of age or over, who resides out of the State or who has not been a resident of the State twelve months subsequent to his twenty-first birthday or for the twelve months immediately preceding the date of registration. The tuition fee for nonresident students registering for less than 12 credit hours will be reduced by $16.00 for each credit hour less than 12.

The term "residence" as used herein means "domicile" and the term "resided in" means "domiciled in."

The legal residence of one who is under twenty-one years of age is that of the father. Upon death of the father, the legal residence of the minor is that of the mother. Upon divorce of the parents, the residence of the minor is determined by the legal residence of the person to whom custody is granted by the court. In the absence of any grant of custody, the residence of the father continues to control. Upon death of both parents, the legal residence of the minor continues to be that of the last surviving parent until he becomes twenty-one unless he makes his home with his grandparents, whereupon their residence is controlling.

Individuals who have come from without the state of Texas and who register in an educational institution of the State prior to having resided in the State for a period of twelve months shall be classified as nonresident students; and such nonresident student classification shall be presumed to be correct as long as the residence of such individuals in the State is during their attendance at educational institutions, regardless of whether such individuals have become qualified voters, have registered motor vehicles and paid personal property taxes thereon, have obtained Texas drivers' licenses, or have otherwise attempted to establish legal residence within the State.

A student under twenty-one years of age shall not be classified as a resident student until his parents shall have maintained legal residence ("domicile") in this state for at least twelve months. A student under twenty-one years of age whose parents leave the State to reside in another state normally shall be classified immediately as a nonresident student. It shall be the responsibility and duty of the student to submit legal evidence of any change of residence.

Individuals of twenty-one years of age or less whose families have not resided in Texas for the twelve months immediately preceding the date of registration shall be classified as nonresident students regardless of whether such individuals have become the legal wards of residents of Texas or have been adopted by residents of Texas while such individuals are attending educational institutions in Texas or within a year prior to such an attendance or under circumstances indicating that such guardianship or adoption was for the purpose of obtaining status as a resident student.

All individuals who have come from without the state of Texas and who are within the State primarily for educational purposes are classified as nonresidents. Registration in an educational institution in the State is evidence that residence is primarily for educational purposes even though such individuals may have become qualified voters, have become legal wards of residents of Texas, have been adopted by residents of Texas, or have otherwise attempted to establish legal residence within the State.

A student twenty-one years of age or older who comes from without the State and desires to establish a status as a resident student must have resided in the State as a legal resident for a period of at least twelve months and must have the intention of establishing a permanent residence within the State during that entire period.

All aliens shall be classified as nonresident students except that an alien who has applied for naturalization in the United States and has received his first citizenship papers or immigrant cards shall have the same privilege of qualifying as a resident student as a citizen of the United States. The twelve months' residence required to establish the status of a resident student shall not begin until after such first citizenship papers or immigrant cards have been received by the alien.

Officers, enlisted personnel, selectees or draftees of Army, Army Reserve, National Guard, Air Force, Air Force Reserve, Navy, Naval Reserve, or the Marine Corps of the United States who are stationed in Texas by assignment to duty within the borders of this state, shall be permitted to enroll themselves, their husband or wife as the case may be, and their children by paying the tuition fees and other fees or charges provided for regular residents of the state of Texas, without regard to the length of time such officers, enlisted personnel, selectees, or draftees have been stationed on active duty within the State. This provision shall extend only during active military service in Texas; and upon such member of the Armed Services being transferred outside the state of Texas, he and his children shall be classified as to residence under the second paragraph of these regulations. Any student claiming the privilege of this section shall submit at each registration a statement by the commanding officer of the post or station at which he or his parent is on active duty verifying the fact of his or his parent's military status.

The residence of a wife is that of her husband; therefore a woman resident of Texas who marries a nonresident shall be classified as a nonresident and shall pay the nonresident fee for registration subsequent to her marriage. A nonresident woman student who marries a resident of Texas is entitled to be classified immediately as a resident student and is entitled to pay the resident fee for all subsequent registrations.

Appointment as a member of the teaching or research staffs or the holding of a fellowship, scholarship, or assistantship shall not affect a student's residence status or the tuition fee to be paid.

It shall be the responsibility of the student to pay the correct fee at the beginning of each semester or term for which he may register, and a penalty of $10.00 shall be assessed for failure to pay the proper fee.

The responsibility of registering under the proper residence is placed upon the student, and it is his duty, at or before registration, if there is any possible question of his right to legal residence in Texas under the State law and these regulations, to raise the question with the proper admissions officer and have such question settled prior to registration. Change in residence classification shall be only by the proper admissions officer.

## PAYMENTS

Payments to the Fiscal Department may be made by cashier's check or money order, payable to the Agricultural and Mechanical College of Texas. All checks, money orders, and drafts are accepted subject to final payment.

## REFUNDS

Any student withdrawing officially (a) during the first week of class work in a semester will receive a refund of four-fifths of the tuition fee; (b) during the second week of class work, three-fifths; (c) during the third week of class work, two-fifths; (d) during the fourth week of class work, one-fifth; (e) after the fourth week of class work, nothing. No refunds will be made until ten days have elapsed from the time the fees were paid.

Students withdrawing from a laboratory course during the first week of class work in a semester will receive a refund of 100% of the laboratory fee paid. Students withdrawing from a laboratory course after the first week of class work in a semester shall not be entitled to a refund.

A refund of board and laundry payment will not be made unless there is a consecutive absence of not less than ten days due to illness of the student or a member of his family, or for some other unavoidable cause.

Students withdrawing during the first week of the Fall Semester will receive a 100% refund of the Student Activities fee. Students withdrawing after the first week of the Fall Semester and before the end of the first week of the Spring Semester, will receive a refund of $6.55 and will be entitled to receive a copy of the student annual. Students withdrawing after the first week of the Spring Semester will receive no refund.

Students not enrolled in the first semester and withdrawing during the first week of the Spring Semester will receive a 100% refund of the Student Activities fee. No refund will be made to students withdrawing after the first week, but the student will be entitled to receive a copy of the student annual.

## DEDUCTIONS

No deductions will be made from charges for board, room rent, or laundry in case of entrance within ten days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten days of a semester or the last ten days for which payment is made.

## UNPAID CHECKS

If a check or draft accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of $2.00.

## DUPLICATE RECEIPTS

Duplicate receipts for fees paid by students will be issued on payment of twenty-five cents.

## TUITION FEE

The tuition fee, fixed by the State law, includes the cost of necessary classroom supplies and entitles the student to the usual college privileges, including the use of the library.

## AUDITING OR VISITING FEE

The fees for courses audited or visited by students shall be the same as for courses for which credit is given.

## STUDENT SERVICES FEE

The student services fee is required of all students and covers the services at the College Hospital and the Memorial Student Center and the intramural program. Surgical operations and charges for consultations with outside physicians requested by parents are not included.

## PROPERTY DEPOSIT

The property deposit of $10.00 is charged to insure against loss for damage, breakage, etc., and is required by law. It is to be paid by all students and is refundable when graduating or leaving the College.

## STUDENT ACTIVITIES FEE

The student activities fee is optional. Students who do not pay this optional fee for the fall semester, the spring semester student activities fee will be $12.55. This fee entitles the student to receive the Battalion newspaper, the College Annual, and the magazine published by the school in which the student is registered, admission to all intercollegiate athletic events played at the College under the auspices of the Athletic Department, the Town Hall programs, and the Great Issues and Recital Series.

## ROOM RENT

Rooms are furnished with single bedsteads, mattresses, tables and chairs, and running water. The charge for room rent also includes heat, light, and cleaning the corridors but not the rooms.

## VOCATIONAL REHABILITATION AID

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and required fees to certain students in Texas colleges. Eligibility for such assistance is based on permanent physical disabilities and other chronic conditions.

Application should be made to the Texas Education Agency, Division of Vocational Rehabilitation, Room 505, Varisco Building, Bryan, Texas, or to C. G. Fairchild, Director, Division of Vocational Rehabilitation, Capitol Station, Austin 11, Texas.

# SCHOLARSHIPS, FELLOWSHIPS, AND AWARDS

The scholarship program is administered by a permanent committee known as the Faculty Committee on Scholarships. As authorized by the Board of Directors, this committee is composed of the Dean of Instruction who serves as chairman; Secretary of the Former Students Association; and representatives, appointed by the President, as follows: one from the Counseling and Testing Center and one from each of the undergraduate schools of the College.

In general there are three types of scholarships available: (1) Valedictory Scholarships and Opportunity Awards, representing those limited to entering freshmen; (2) scholarships designed for the more advanced undergraduate students; and (3) fellowships and grants-in-aid for graduate students.

The over-all program is designed to encourage and reward scholastic effort on the part of all students; to enable outstanding students to do the best work of which they are capable by removing financial handicaps; and to enable capable and ambitious young men who might be denied a college education for financial reasons only to secure that education at the Agricultural and Mechanical College of Texas.

## Valedictory Scholarships

The College offers a scholarship to the valedictorian, if a boy, graduating from an accredited secondary school of Texas, who holds at least fifteen units acceptable to the College and accredited by the Texas Education Agency. The successful applicant must make the highest record among all students, boys and girls, graduating that calendar year, including winter, spring, and summer graduating classes, and must be certified to the College through the Texas Education Agency. The scholarship is valid beginning with the first summer session or long session semester after the holder's graduation from high school. The financial benefit is exemption from payment of tuition fees ($25.00 for each six week term of the summer session, and $50.00 each semester of the long session, not to exceed a grand total of $400.00) and laboratory fees for a period equivalent to four academic years (eight semesters) under the following terms and conditions:

1. The student's initial enrollment must be in this College.

2. To be eligible for the award any semester or summer term, the student must schedule at least 15 hours in a semester of the long session or 6 hours in a six-week term of the summer session.

3. On such a schedule the student must make a grade point ratio of at least 1.00 during his first year in college to be eligible for the award the succeeding year. After his first year, he must make a grade point ratio of at least 2.00 to be eligible to use the scholarship in the succeeding years.

4. The student's eligibility for any part of the scholarship shall not extend beyond the end of four calendar years from the time of high school graduation.

5. The conduct of the scholarship holder must be satisfactory to the faculty.

6. The student must be a legal resident of the State of Texas for school purposes.

7. Any student who may have lost his scholarship for academic reasons may have it reactivated on the basis of his performance during any twelve-week summer session or long session semester.

## The Opportunity Award Program

This program annually provides approximately 100 four-year scholarships to high school graduates of Texas who are capable of outstanding scholastic achievement and who need financial assistance to attend college.

The awards are made possible through the A. and M. College Development Fund and by interested citizens and organizations of the State. Financial benefits range in value from $800 to $1600 with recipients receiving from $200 to $400 each year for four years plus an opportunity for additional earnings from student employment if necessary. Most of the awards are unrestricted as to course of study or degree objective in college.

Graduates of accredited high schools of Texas who have not attended another college or university, who are legal residents of this state, and who need financial assistance to attend college are eligible to make application for an Opportunity Award Scholarship. To be considered for such a scholarship, an applicant must satisfy the admission requirements of the College; must make formal application for an award on forms provided by the College; and must enter the state-wide competition which is held each spring. Selections are made by the Faculty Scholarships Committee on the basis of the applicant's academic record in high school; his scores on competitive examinations; evidence of initiative, leadership, and other traits of good character; and his need for financial assistance. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Scholarships Committee.

This program is usually announced officially during the latter part of the fall semester each year. Official announcements and application blanks are distributed over the State at that time and are also made available to those interested upon request. Requests for additional information and application forms should be addressed to the Secretary, Faculty Committee on Scholarships, Office of the Registrar, A. and M. College of Texas, College Station, Texas.

### Scholarships for Advanced Undergraduate Students

One-year scholarships ranging in value from $100 to $750 are available to outstanding students already enrolled in the College. Some of these are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted in this regard. Recipients are usually chosen by the Faculty Committee on Scholarships in April or May each year with the basis of selection determined by the nature and intent of the award.

Some of these scholarships are given as "rewards for a job well done" and are intended to recognize outstanding scholastic achievement or other meritorious accomplishments. As such, they not only benefit financially the student concerned but also encourage and promote scholastic attainment and leadership on the part of other individuals. In addition to the reward type of scholarship, others are made available to outstanding students who must have financial assistance in order to remain in school or to do a high quality of work while enrolled. It is the general objective of this type of award to encourage every scholar to go as far as his abilities and ambition will carry him.

Information regarding scholarships for advanced undergraduate students may be obtained from the Secretary, Faculty Committee on Scholarships, Office of the Registrar.

# STUDENT LIFE

## LEADERSHIP AND GUIDANCE

Leadership and guidance in the area of student life are the responsibilities of the Dean of Students. Responsibility for the enforcement of College regulations lies with the Director of Student Affairs for civilian students and with the Commandant of Cadets for military students. Appeals by civilians may be made to the Director of Student Affairs and by military students to the Commandant.

The student government of the College is carried out through the Student Senate. The office of the advisor of the Student Senate and the files for the organization are in the Directorate Office, west end, ground floor of the Memorial Student Center.

The Civilian Student Council serves as the official governing body for civilian students, with responsibility in those areas affecting civilian students only. The Council is advised by the Department of Student Affairs.

## BASIC POLICY

The rules of conduct by which every student is expected to live while attending the A. and M. College of Texas are contained in the Basic Policy, a copy of which follows:

The Board of Directors finds it necessary to assert the basic principles to govern student life and staff-student relationship at the A. and M. College of Texas.

The College accepts responsibility for the curricular work of the student and for his conduct and development. The term "College" as used here embraces the Board of Directors, the President, the faculty, all personnel of the A. and M. system, the student body, former students, and all the worthy traditions of the institution.

Every student is expected at all times to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of his time toward an education.

Every student has rights which are to be respected. They include the right of respect for personal feelings, the right of freedom from indignity of any type, the right of freedom from control by any person except as may be in accord with published rules and regulations of the College, and the right to make the best use of his time and his talents toward the objective which brought him to this institution. No officer or student, regardless of position or rank, shall violate those rights. No custom or regulation in conflict will be allowed to prevail.

It shall be the duty of every person employed by this institution to conform to this policy; to cooperate with all agencies of the College and with the student body, individually and collectively, in carrying out its provisions. Personal responsibility in this respect will be primary.

## THE OFFICE OF THE DEAN OF STUDENTS

Responsibility for the development and welfare of the student in areas other than academic is placed with the Office of the Dean of Students. Activities are provided which help to meet the physical, emotional, social, and spiritual needs of students.

Student personnel departments and offices under the direction of the Dean of Students include the following:

Commandant (Headquarters of the Corps of Cadets)
Army ROTC

Air Force ROTC

Student Affairs, Veterans Advisory Service, Foreign Student Advisor, Campus Security, Housing and Civilian Counselors

Memorial Student Center

Placement of Graduates, Student Labor and Loan, Short Courses

Student Health Services and Campus Hospital

Y.M.C.A. and the All Faiths Chapel

## STUDENT AFFAIRS

The Department of Student Affairs includes the activities and functions of the Veterans Advisors Office, the Housing Office, Civilian Dormitory Counselors, the Foreign Student Advisor's Office, and the Campus Security Office.

## VETERANS ADVISORY SERVICE

The A. and M. College of Texas provides a Veterans Advisor to assist ex-servicemen with their problems. Assistance is given also to war orphans in securing payment from the Veterans Administration.

The office of the Veterans Advisor is located on the ground floor of the YMCA Building.

## HOUSING AND MEALS

**Single Students:** Unless they are living with their families, all students are required to live in College-owned dormitories on the campus. Dormitories are designed especially to meet the student's needs of living and study.

Reservations are filed in the order in which they are received and will be held only until 3 p.m. of the regular registration day. Reservations made by students who do not complete their registration on the regular registration day by 5 p.m. may be cancelled, and the space will be assigned to another applicant.

New students may file room reservations as soon as they have been accepted by the Director of Admissions and Registrar. As soon as a new student has been accepted for admission, he will be mailed a room reservation request card, which should be filled out as directed and returned to the Fiscal Office with a check or money order for $6.00 for room reservation fee and key deposit. As soon as the reservation has been made, the student will be notified of his assignment to dormitory space. The room reservation fee will be credited to the student as part of his room rent payment upon his registration in June, September, or February. Should a student decide that it will be impossible for him to register, he may have his reservation cancelled, provided he notifies the Housing Office prior to the regular registration day of the semester for which the reservation has been made. In such cases the room reservation fee may be returned. Cancellations made after the regular registration day indicated above will result in a forfeit of the reservation fee. The room assignment card and room reservation fee receipt will be secured at the Housing Office, Ground Floor, YMCA Building, when the student reports for registration.

All cadets residing on the campus are required to take their meals in one of the two dining halls on the campus, operated by the Subsistence Department of the Business Office. Each has a seating capacity of 4,000 and furnishes the students at cost well-balanced meals prepared under the direction of experienced supervisors.

Those students who are not members of the Cadet Corps may also eat their meals in the College dining hall. They, however, may take their meals elsewhere if they so desire.

**Married Students:** The College has ample apartments for married students, consisting of 351 furnished two-bedroom apartments, 312 furnished one-bedroom apartments, and 115 unfurnished two-bedroom apartments. More complete information and application forms may be obtained from the Housing Office, Ground Floor, Y.M.C.A. Building.

## FOREIGN STUDENT ADVISOR

The Office of the Foreign Student Advisor is located in Room 27, Milner Hall. Information relative to immigration regulations and assistance with problems peculiar to students from other lands may be obtained from this staff member.

## REGISTRATION OF MOTOR VEHICLES

All students and employees who drive motor vehicles on the campus must have them registered in the Office of Campus Security, Ground Floor, YMCA Building, within 48 hours of the time that they are brought on the campus.

Students are assigned parking areas according to their housing assignment. Cars must be parked in these designated areas during the regular classroom hours.

## MEMORIAL STUDENT CENTER STUDENT PROGRAMS

Dedicated to the memory of the men of the Agricultural and Mechanical College of Texas who gave their lives during World Wars I and II, the Memorial Student Center was erected to foster the social, cultural, and spiritual phases of student life.

General facilities of the Memorial Student Center include a dining room, cafeteria, snack bar, gift shop, telephone and telegraph center, barber shop, 66 guest rooms, travel agency, check cashing and information center, student organizations banking center, and United States Post Office. Recreational facilities include bowling lanes, table tennis area, game room, browsing library, and record playing rooms. A large number of meetings, receptions, exhibits, and social affairs given by the student and staff organizations of the College are held at the Center.

Included in a special activities program of the Memorial Student Center Directorate are the following special interest committees: Music, Dance, Radio, Camera, Browsing Library, Film Society, Recital Series, Great Issues, Flying Kadets, Bowling, Table Tennis, Chess, Public Relations, Personnel, Evaluation, and the Student Conference on National Affairs. These activities are governed by the Memorial Student Center Council, composed of nine students, five faculty members, and two former students, with a student as president of the Council. The Directorate, which is composed of the various committees, plans and directs the entire program. Many positions of leadership are open in this student program for those who join the committee activities at an early date.

The Memorial Student Center Student Program Staff is charged with counseling and fiscal operation of many student activities. It sponsors cultural, recreational, and entertainment activities on the campus, including the campus movie program, music activities, social activities; serves as banker for all recognized student organizations (approximately 325); is the agency of the College to officially recognize student organizations; and serves as financial advisor, "Club Aid" for departmental student organizations, student government, and other co-curricular activities.

The Memorial Student Center Building Cashier provides banking service for the numerous student organizations on the campus and for the Memorial Student Center businesses. The Cashier's window is also headquarters for the sale of season and individual tickets for various campus presentations, including Great Issues and Town Hall.

**Clubs:** Many opportunities exist for students interested in co-curricular club activities. There are more than 150 organization on the campus, ranging in interest from hometown clubs to technical societies. Their activities include discussion meetings, movies, smokers, barbecues, dances, and inspection trips.

**Dances and Social Affairs:** Social Life at the Agricultural and Mechanical College of Texas is highlighted by numerous dances and social functions. The various classes, military units, and civilian organizations sponsor dances. In addition, certain all-school social functions are held for which outstanding name bands provide music. The most elaborate function is the traditional Senior Ring Dance and Banquet, when graduating seniors and their guests dance to an outstanding orchestra of the year. All parties and other social functions, whether held on or off the campus, must be approved by the College.

**Town Hall:** The Town Hall series includes the best obtainable artists in the fields of music, dance, and theatre. Since its inception, the Town Hall roster has boasted such names as Bob Hope, Doris Day, Oscar Levant, Marge and Gower Champion, the Ballet Russe de Monte Carlo, Fred Waring, Ray Coniff, the Kingston Trio, the Houston Symphony, the Boston Pops Orchestra, several Broadway musicals, and many other famous entertainment features. Activity fees and the sale of season and individual tickets make it possible to bring these outstanding programs to the student body at low prices.

**Singing Cadets:** This widely known singing unit consists of more than 60 students. The group has appeared in many Texas cities and in Mexico, on numerous broadcasts and telecasts, and on various other entertainment programs. Membership is selected from the entire student body by auditions held early in the fall semester.

**Dance Band:** The All-College Dance Band is made up of both civilian and military students, along with staff members. Each year the band plays for various dances and shows on and off the campus. Dance tours are made throughout the State to play for A. and M. Club dances. Members are chosen by competitive audition at the beginning of the fall semester, and rehearsals are held once a week in Guion Hall.

**Music Hall:** For students interested in music, a building with practice rooms and pianos is provided. It is open for use from 8 a.m. until 5 p.m., but may be used by special permission at night for instrumental or vocal groups.

**Guion Hall Theater:** The Guion Hall Theater is operated on weekends to provide economical and convenient movie entertainment for the student body and College staff. Although good pictures are shown, they are usually second-run shows in order to keep costs as low as possible. Guion Hall is also used as a meeting place, a concert hall, and for dramatic presentations.

**The Grove:** The Grove is an outdoor concrete recreational area with a stage, utilized by the Memorial Student Center for the scheduling of movies, intramural athletics, concerts, dances, picnics, games, and festivals.

## THE AGGIE PLAYERS

This is a student organization that offers active participation in theater work for college credit or as extracurricular activity. The Aggie Players present three to five major dramatic productions a year, and any student is invited to join.

## DEBATE ACTIVITIES

The Aggie Discussion and Debate Club is sponsored jointly by Student Activities and the Department of English. Activities include the annual A. and M. debate tournament, six other tournaments, poetry reading, extemporaneous speaking, and oratory. Interested students should come to the Department of English.

## COLLEGE HEALTH SERVICES

The College Hospital has been remodeled recently to give more efficient service. Besides infirmary space for over 100 patients, the facilities now include a complete physiotherapy department as well as new laboratory and x-ray departments. The medical staff includes specialists in the fields of medicine, surgery, radiology, and ear, nose, and throat.

The Clinic is open from 8 a.m. to 5 p.m. on weekdays and from 8 a.m. to 12 noon on Saturdays. The Student Services fee provides for clinic visits, diagnostic examinations, care for acute illness, emergency care for accidents, and 10 days of infirmary care each semester in cases requiring hospitalization. Routine medications for acute illnesses, x-rays, laboratory tests, and local ambulance service are also furnished the student without charge. A staff of Registered Nurses is on duty, with a staff physician on call, to care for emergency cases at any hour.

The water of the College is supplied through a College-owned water supply system and comes from four deep wells located nine miles northwest of the College campus. As a part of the sanitary work carried on throughout the entire year, the College laboratories make bacteriological checks of this water supply and of the milk supply at regular intervals.

The College is particularly concerned with the maintenance of the health and physical development of its students. It provides one of the finest indoor swimming pools in the State, as well as tennis courts, a golf course, athletic fields, and physical training.

## RELIGIOUS ACTIVITIES

The A. and M. College of Texas is non-sectarian, but its high objectives cannot be achieved unless its educational program is founded on a solid religious life. Divorced from the spiritual aspirations of the individual and of the group, education cannot be complete. The basic purpose of education is a normal religious life to the end that young people may be not only more efficient but better motivated by a sense of duty and obligation. Thus, in an atmosphere of tolerance and mutual respect, every student is encouraged to maintain his ties with the religious group to which such association may be made most fruitful.

**Young Men's Christian Association:** The YMCA endeavors to develop the full, rounded man by emphasizing growth in mind, body, and spirit. Because of the effect of the YMCA on the lives of many students, it holds a coveted spot in the hearts of Aggies.

The varied and vigorous program of the YMCA depends on student participation, initiative, and leadership. The program is centered around stimulating the moral and spiritual lives of the students and includes religious discussions, Bible study, conferences, intercollegiate visits, steak fries, leadership development, Freshman Camp, Religious Emphasis Week, United Nations Club, Preparation for Successful Marriage Forums, and many other worthwhile projects.

**All Faiths Chapel:** The beautiful new All Faiths Chapel, a gift of the Former Students, is made of Austin limestone and glass, and is modern in design.

In addition to encouraging individual meditation and prayer and serving as a meeting place for small religious groups, the other activities foreseen include making available a library of religious books, a secluded meditation room, accommodations for small weddings, funerals, memorial services, baptisms, vesper services, and other religious rites. The Chapel is open at all hours for meditation and prayer.

**Religious Services:** In addition to the college religious life staff, there are ten churches near the campus whose primary purpose is to serve the spiritual needs of the students. The campus religious leadership is deeply conscious that the students are in perhaps the most formative period of their lives and feel keenly the responsibility for their spiritual development.

The programs of the respective churches are aimed primarily to meet the student needs. Many of the churches have distinct student departments with specialized leadership whose sole responsibility is that of ministering to the students. The pastors of the churches also give as much time as is necessary to the students for personal counseling.

The churches serving the campus have a program similar to that of the home church with an expanded young people's department and dominant emphasis upon student interests. In addition to the special student emphasis, they have the customary Sunday worship periods, church schools, and young people's organizations promoted to stimulate clear and constructive thinking in the important field of religion. The student departments are expanded to offer wholesome recreation and social life and social service.

**Religious Emphasis Week:** One week during each year is designated officially by the College administration as Religious Emphasis Week, in which the entire College cooperates, making it possible to have an outstanding religious leader to address voluntary convocations of the students. The administration of the College, knowing the value of developing the spiritual aspects of the personality of the student, authorizes an adjustment of the College program so as to permit all students to attend.

**Courses in Religious Education:** The Baptist General Convention of Texas; the Church of Christ; the Episcopal Church, Diocese of Texas; the B'nai B'rith Hillel Foundation; the American Lutheran Church; the Lutheran Church, Missouri Synod; the Methodist Church; the Presbyterian Church, U.S.; the Presbyterian Church, U.P.U.S.A.; and the Roman Catholic Church, Diocese of Austin, upon approval of their respective boards, have been authorized to offer courses in Religious Education open to students of junior and senior classification.

A maximum of six semester hours from the following courses in religious education may be applied toward a degree from the College.

**305. Old Testament Character Studies. (1-0). Credit 1.**

Through a chronological study of many characters in the Old Testament, the student becomes acquainted with experiences in the lives of these characters, through which is revealed the righteous and omnipotent God of the Old Testament.

**306. New Testament Character Studies. (1-0). Credit 1.**

After a brief introduction to the New Testament giving the political, social, moral and religious situation at the time of Jesus' birth, the course will pursue a character study of key personalities in the New Testament and their contribution to the Christian system of thought.

**309. Early Old Testament History. (1-0). Credit 1.**

Story of Bible history as recorded in first five books; study divided into five periods between the Creation and the Wilderness wanderings.

**310. Later Old Testament History. (2-0). Credit 2.**

Periods of Bible history studied include: conquest of Canaan, the Judges, the united Kingdom, the divided Kingdom, Judah alone, the exile, and return from exile.

**311. The Synoptic Gospels. (2-0). Credit 2.**

A study of the first three Gospels, Matthew, Mark and Luke, with emphasis upon the contribution of each to our knowledge of the life and teachings of Jesus.

**312. The Gospel of John. (1-0). Credit 1.**

This course is a detailed study of the life and teachings of Jesus as reported in the fourth Gospel. Special attention is given to interpretation of Jewish customs and institutions for the non-Jewish (Greek) readers.

**313. Survey of the New Testament. (2-0). Credit 2.**

Each book of the New Testament is studied with reference to its author, purpose, content, unique characteristics, and the historical background which provided the occasion for its writing.

**314. Survey of the Old Testament. (3-0). Credit 3.**

Each book of the Old Testament is studied in light of the historical background of the Hebrew people and the development of their relationship with God.

**318. The Book of Acts. (1-0). Credit 1.**

Chapter by chapter study of Acts; founding and spread of church in Jerusalem, Judea, Samaria; Paul's travels; church among the Gentiles.

**319. The Epistles of Paul. (2-0). Credit 2.**

A study of the life and thought of Paul as found in the Book of Acts and Pauline correspondence. A history of the primitive church as reflected in these writings.

**320. The Book of Revelation. (1-0). Credit 1.**

This book is studied in the light of the persecution of Chrisians in the Roman Empire, and as an apocalyptic writing to serve in strengthening their faith in and loyalty to Christ and to his teaching.

**321. The General Epistles. (1-0). Credit 1.**

A study of the "open letters" written by James, John, Peter, and Jude to the early Christian churches, comparing their messages with the recorded words of Jesus relative to the situation and problems of their day and ours.

**323. The Life of Jesus. (3-0). Credit 3.**

In this course, the four Gospels are studied with the passages in the four books arranged in chronological sequence so as to give a connected account of the life of Christ and to reveal similarities and differences in the four books.

**324. The Prophetic Movement in the Old Testament. (3-0). Credit 3.**

A history of the prophetic movement from the 8th century B.C. to the time of the Maccabees. An interesting study of the contribution of the prophets to the religious thinking of the day, and the permanent value of their teachings.

**325. The Book of Job. (2-0). Credit 2.**

The book of Job is one of the great books of all time. It offers in interesting form a thorough study of the problem of suffering.

**326. The Psalms. (2-0). Credit 2.**

This study of the book of Psalms includes a glance at Hebrew poetry, at the source and background of certain of the Psalms, and a study of their beauty of structure and composition and of their interpretation.

**327. An Introduction to the Bible. (2-0). Credit 2.**

A course to acquaint the student with the Bible showing its unity and the continuity existing between the Old and New Testaments by a study of representative sections of both Testaments together with their historical settings and their relationship to each other.

**329. Proverbs. (1-0). Credit 1.**

This study of the book of Proverbs includes authorship, date of writing, and a close study of the practical wisdom contained in the proverbs, of which the book is full.

**330. Ecclesiastes and the Song of Solomon. (1-0). Credit 1.**

A study of two neglected books of the Bible—their contents, interpretation, and significance.

**335. Comparative Religions. (2-0). Credit 2.**

A study of the most popular contemporary religions of the world as channels through which men have tried to find the meaning of life and to relate themselves to its values. It includes Buddhism, Confucianism, Mohammedanism, Judaism, and Christianity.

## CORPS ACTIVITIES

The aim of the Corps of Cadets is to offer a sound collegiate education in both mind and body under strictly military discipline. The method of administration of this military discipline and its extension to all phases of the cadet's non-academic life are distinctive at the Agricultural and Mechanical College of Texas. Students are organized along military lines and observe military practices at all times. They habitually wear the prescribed uniform on the campus and live in rooms assigned to them on the basis of their military organization. From reveille to taps, every hour of the cadet's time is accounted for. The regular habits of study and living thus formed, the attention to duty, obedience to authority, and love for order inculcated are considered among the most valuable features of the military education. While some of the graduates enter the military profession, hundreds in all walks of civil life attest to the high value of the training received at this institution.

An integral part of the military system is the requirement of freshmen of certain extra duties and activities at the beginning of their college career. During the early weeks of their first year the cadets have special drills under their cadet officers and follow a rigorous program of behavior designed to improve their military posture and to inculcate early respect for upperclassmen who are their military superiors. These special activities do not interfere unduly with the freshman's academic program nor usurp his prerogatives as a private individual. They are supervised by responsible cadet officers under the general supervision of the Commandant and are to be distinguished from irresponsible hazing which is forbidden by the rules and regulations of the College.

In keeping with the democratic ideals of the Agricultural and Mechanical College of Texas, the formation of exclusive societies or fraternities, membership in which is based on other requirements than individual worth and achievement is forbidden. When new cadets report to the College, all are at once put in uniform and, as far as possible, all artificial distinctions based on wealth, position, or influence are minimized and the cadet is encouraged to achieve his place by individual merit. All cadets live under practically identical conditions, and all are rated by the same standards, but there is a wide range of opportunity for each to develop in accordance with his needs and aptitudes.

Among Cadet Corps organizations is the Ross Volunteer Company, a military group composed of outstanding cadets. This unit was organized in 1887 by Colonel T. M. Scott, business manager of the College, for the purpose of banding together the most proficient military men at A. and M. College into a precision drill team. They were first called the Scott Volunteers. The name was changed to Ross Volunteers in 1891 to honor Governor Lawrence Sullivan Ross, who in that year became President of the College. It was originally the plan of the organization to change its name in honor of each succeeding president of the College, but in 1902, at President Harrington's request, the idea was dropped and the name Ross Volunteers made permanent.

There are several important cadet organizations that do not come under a specific classification. The following should be mentioned as having distinctive functions in cadet life: the Aggie Band, the largest college military band in the United States; the Rifle and Pistol Teams, which compete in national matches; and the Freshman Drill Team, a precision military drill team.

## STUDENT PUBLICATIONS

The College provides unusual opportunity for students to participate in student publications. An Office of Student Publications, headed by the Director, works within the framework of policy established by the Board of Student Publications.

The Office of Student Publications, together with editorial offices, is located on the Ground Floor of the YMCA Building.

The following seven publications are issued:

**The Battalion:** The Battalion is the student newspaper edited and produced by Texas A. and M. students. It is also the official newspaper of the City of College Station. Students who begin work as freshmen or sophomores may become paid employees in editorial capacities during their junior and senior years.

**The Aggieland:** The yearbook of the student body is known as **The Aggieland.** Many opportunities for participation are available because of the amount of work necessary to produce a complete record of the school year.

**Student Directory:** Each year the Office of Student Publications publishes an official directory of offices, staff personnel, and students for the College.

**The Engineer:** Published six times annually by students in the School of Engineering, this journal is designed to inform and to promote talent for technical writing. Students who have ability in research, in reporting scientific data, or in creative writing, are welcome as members of the staff.

**The Agriculturist:** Students of the School of Agriculture produce **The Agriculturist,** a quarterly publication printing research, scientific and technical articles relating to the field of agriculture.

**The Southwestern Veterinarian:** The leading college veterinary magazine in the country, as well as in foreign countries, this publication is produced quarterly by the students of the School of Veterinary Medicine.

**The Texas A. and M. Review:** Students of the School of Arts and Sciences publish **The Texas A. and M. Review,** a campus-wide magazine of general interest, four times each year.

## THE TEXAS AGGIE BAND

The Texas Aggie Band is the official band of the A. and M. College. It is often referred to as the "pulse of the Spirit of Aggieland" and furnishes music for military ceremonies, yell practices, and athletic events.

Interested new students should indicate on the advanced room reservation card their desire to participate. No try-outs are necessary. Although a large number of College-owned and government-owned instruments are available for issue, it is advised that students having their own instruments bring them.

## INTRAMURAL ATHLETICS

Intramural athletics feature contests between military units and between civilian organizations. The intramural program, which is one of the most outstanding in the country, includes flag football, softball, volleyball, handball, basketball, track, swimming and diving, wrestling, bowling, horseshoes, rifle shooting, golf, cross country, tennis, and table tennis. Ample physical facilities are available to accommodate these comprehensive intramural activities.

## INTERCOLLEGIATE ATHLETICS

The A. and M. College of Texas is a member of the Southwest Athletic Conference, which embraces eight leading major colleges and universities—The University of Texas, the Agricultural and Mechanical College of Texas, Baylor University, Rice University, Texas Christian University, Southern Methodist University, the University of Arkansas, and Texas Technological College. The intercollegiate program includes, football, baseball, basketball, track, cross country, swimming, tennis, and golf. Varsity teams in each sport are known as the Texas Aggies, and the uniforms used by the players are in the school's colors, maroon and white.

Center of athletics is Kyle Field, which contains the football stadium seating 33,000 in the old stands, 2,460 in the new addition to the west stands, and with temporary bleachers and cinder path boxes giving a total capacity of 41,594. A quarter-mile cinder track with a 220-yard straight-away and a baseball diamond with 4,000 seats afford excellent facilities for these sports. The P. L. Downs, Jr., Natatorium with swimming pool 100 by 60 feet, has lockers and showers, and seats for 600 spectators. DeWare Field House has been converted from a 3,500-seat basketball gymnasium into a Physical Education Plant, while the new G. Rollie White Coliseum seating 8,500 is available for basketball and other indoor College events. An outdoor swimming pool is now under construction in the area west of the P. L. Downs, Jr., Natatorium. An 18-hole golf course is available to students on the campus.

## OFFICE OF PLACEMENT AND SPECIAL SERVICES

### Employment for Graduates

The College feels a definite responsibility for the proper professional placement of its graduates. Assistance in fulfilling this responsibility is shared jointly by the faculty and the Office of Placement and Special Services. The function of this office is to maintain active contact with prospective employers of the graduating students and alumni in such manner that well qualified men may be directed to suitable job opportunities.

Supplementing assistance in securing professional employment, this office cooperates with other College departments in an educational program designed to acquaint undergraduates with opportunities in the fields of work in which they are interested, and to advise on problems which will be met in entering professional employment. Assistance is given students in preparing credentials for submission to employers as well as advice on the proper approach in seeking a job. Assistance is also given undergraduates in securing employment during the summer vacation.

Seniors and graduate students who wish to make use of these services are requested to file a record of their qualifications with the Placement and Special Services Office early in the year in which their college work will be completed. There is no charge for this service other than for personal leaflets, which are prepared at cost on request.

### Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Every effort is made to develop new employment opportunities outside of the College. To become eligible for employment, a student must have been admitted to the College by the Director of Admissions and have an accepted application on file with the Office of Student Labor and Loans. Continued eligibility for employment is contingent on satisfactory performance of work and on the ability of the student to maintain good scholastic standing.

Ordinarily only those students whose financial resources are limited may be considered for employment. Assignments are made primarily on the basis of need and sincerity of purpose.

### Loan Funds

The Association of Former Students administers a series of loan funds which are available to any student who has been in the College at least three semesters, and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available. Information about such may be secured from the Head of the Office of Student Labor and Loans. Included in such funds are the Lucy Jane Breazeale Loan Fund, the Ernestine Gaber Loan Fund, the Davis Buck Fund, the Allsup-Ramsey Loan Fund, the George Long Memorial Fund, the James Leftwich Shepherd Fund, the Sonora A. and

M. Mothers' Club Fund, the A. and M. College Loan Fund, and the Jitterbug Henderson Memorial Loan Fund. Students desiring National Defense Student Loans should apply at this office.

### Special Services

Special services of the Office of Placement and Special Services include the administration of the Short Courses program.

## ACADEMIC REGULATIONS

Certain academic regulations have been set up by the faculty for the purpose of assisting the student to secure the maximum benefit from his studies. These regulations, contained in the copy of **College Regulations** given to each student when he enters the College, serve as a guide in such important matters as choice of course and subjects, methods of study, attendance, examinations, promotion, and graduation.

By means of reports at regular intervals, frequent conferences with the deans, the Registrar, Office of the Dean of Students, and members of the teaching staff, the authorities of the College keep in close touch with the student's progress; and such advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with his studies, the student may at any time be dropped from the rolls of the College.

The College reserves the right to modify the curricula or withdraw any course when it appears wise to do so.

### DEGREES OFFERED

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Arts (B.A.)
Bachelor of Business Administration (B.B.A.)
Bachelor of Science (B.S.)
Bachelor of Architecture (B.Arch.)
Bachelor of Petroleum Engineering (B.P.E.)
Doctor of Veterinary Medicine (D.V.M.)
Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Philosophy (Ph.D.)

On the basis of acceptable professional experience the following professional degrees in engineering are offered to graduates of the College:

Aeronautical Engineer (Aero.E.)
Agricultural Engineer (A.E.)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

## REQUIREMENTS FOR A BACCALAUREATE DEGREE

The diploma of the College, with the appropriate degree, will be granted to the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. He must complete one of the regular courses of study leading to a degree.

2. The total number of grade points earned at this institution in courses applied to this degree must equal at least the number of hours which he carried in courses at this institution which are applied to this degree. Grades of F or WF shall be included, except such grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated satisfactorily during the student's first four semesters in college. Grades of WP shall be excluded.

3. The total number of grade points earned at this institution in courses in his major department applicable to this degree must equal at least the number of hours which he carried at this institution in his major department which are applied to this degree. Grades of F and WF shall be included, but grades of WP shall be excluded.

4. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed such courses need not be repeated.

5. He must have settled all financial obligations to the College.

6. He must be formally recommended for graduation by the Academic Council after consideration of his complete record.

7. Unless registered in absentia or excused by his dean, he must be present in person at the graduation exercises.

These requirements must be completed and all grades on record in the Registrar's Office not later than 5 p.m. on Thursday preceding Commencement Day.

Requirements for an advanced degree are outlined in the Graduate Bulletin.

## APPLICATION FOR A DEGREE

During the semester or summer session preceding the conferring of the degree, a student must be officially registered in the College. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term, in which the student expects to complete his requirements for graduation.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must fulfill the following two conditions:

1. He must be registered for the courses necessary to complete the requirements of his curriculum.

2. For work of his final semester or summer term, he must not lack a grade point ratio in excess of 1.50 in his major field and for his over-all program of studies in order to meet the grade point requirement for graduation.

## RESIDENCE REQUIREMENT

A candidate for a Bachelor's degree must complete the requirements of the final year's work of his curriculum in residence at this institution with the exception of six semester hours, which may be accepted in transfer. However, in every case the student must complete at least 36 semester hours of upper level work of the last two years of his curriculum at this institution.

A candidate for a Bachelor's degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture generally will be limited to those courses taught in the freshman and sophomore years at this institution.

## TWO DEGREES

A candidate for a second Bachelor's degree must have been in residence at least two academic years and must have completed all the essential work of the second curriculum not covered in the first; in all such cases the total amount required must be at least 30 semester hours additional to the greater number required for either degree.

## CHANGE OF CURRICULUM

Applications for change of curriculum shall be passed upon by the deans of the schools and heads of divisions concerned. A student under 21 years of age must have the written consent of his parent or guardian.

At the time of the change, the dean of the school or head of the division to which the transfer is being made will indicate any courses on the student's record which are to be excluded from requirements for his new curriculum and will so advise the Registrar.

## CREDIT BY EXAMINATION

College credit may be given for satisfactory scores on the College Board Advanced Placement Examinations in the following subjects:

**American History**
**Biology**
**Chemistry**
**English Composition**
**French**
**German**
**Mathematics**
**Spanish**

The College offers its own series of advanced placement examinations. These may be taken instead of the College Board Advancd Placement Examinations to obtain college credit. There is no charge for taking these examinations. The Agricultural and Mechanical College of Texas offers credit by examination in the following courses:

**Biology** 101, 107, 115
**Chemistry** 101, 102
**English** 103, 104
**History** 105, 106
**Mathematics** 102, 103
**Modern Language** 101, 102, 103, 104, 105, 106, 109, 110

The Director of Admissions and Registrar will furnish all necessary information to anyone interested in obtaining credit by means of these examinations.

## TRANSFER OF CREDITS

As a general policy credit will be given in transfer for work completed with a grade of C or better at another properly accredited institution. Work completed with the grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the same subject area. Any student desiring to validate work done elsewhere should discuss with the Registrar the conditions necessary for validation of his particular work and secure from him authorization for such action. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory.

Work done in an institution not properly accredited must be validated by one of the two methods of validation already mentioned before it can be transferred.

## CORRESPONDENCE COURSES

The Agricultural and Mechanical College of Texas offers no correspondence courses. A student in residence at this institution will be permitted to receive undergraduate credit for correspondence courses taken elsewhere only when written permission has been granted in advance by the dean of his school.

Credit earned in a course completed by correspondence will be accepted only after a validating examination has been passed unless the final examination is taken under the supervision of the Registrar at this college. An exception will be made in the case of courses taken through the United States Armed Forces Institute.

Not more than twelve semester hours of credit taken in correspondence work may be applied toward the requirements for a degree. No more than 34 semester hours of approved extension class and correspondence study credit may be applied toward a Bachelor's degree.

## REQUIREMENT IN GOVERNMENT AND HISTORY

In order to meet the legal requirements for a baccalaureate degree, all students must have credit for six semester hours of American history or three semester hours of American history and three semester hours of Texas history, in addition to the long-standing government requirement of Government 306 and credit for three semester hours of military or air science. For those students who do not take military or air science, six hours of government must be completed. Such students must complete Government 306 and 307.

In satisfying the government requirement for a teacher's certificate, Government 306 and 307 may be used. Government 305 will fulfill this requirement. Credit for basic military science cannot be used in satisfying this requirement.

## REQUIREMENT IN PHYSICAL EDUCATION

All students under 21 years of age at the time of entrance are required to complete Physical Education 101, 102, 201, 202.

Transfer students will be given exemption from one semester of required physical education for each semester of course work completed at the other institution.

Students who have completed as much as one year of service in the Armed Forces of the United States on active duty will be exempt from the requirement in physical education.

## REQUIREMENT IN MILITARY TRAINING

Any student entering with freshman classification (less than 30 semester hours of credit) who is a citizen of the United States, physically qualified, under 21 years of age, and who has had no previous service with the Armed Forces must successfully complete two years of military training.

Enrollment in air science or military science is synonymous with enrollment in the Corps of Cadets and is a part of military training as offered at this college. The Corps is organized into military units which are constantly under military discipline and supervision; likewise, the members of the Corps are required at all times to wear the appropriate uniform.

Members of the Corps of Cadets who are housed in military units will, upon the completion of the basic course, make application for advanced course contract, and, if qualified, be enrolled in advanced course ROTC. Students are reminded that acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of the ROTC summer camp, and acceptance of a reserve commission if one is tendered. The foregoing become integral parts of the degree requirements of advanced course ROTC students. Therefore, for those students under an advanced course ROTC contract the College will not grant a degree prior to acceptance of a reserve commission. Likewise, the reserve commission will be withheld from advanced course ROTC students who have completed requirements for a reserve commission until they have completed work for their academic degree.

## ELIGIBILITY FOR AN ADVANCED ROTC CONTRACT

To be considered for an advanced course ROTC contract a student must: (1) be morally and physically qualified, (2) attain junior classification with a minimum grade point ratio of 1.00, (3) have satisfactorily completed the ROTC basic course or have served at least one year of active military service, (4) attain a passing score on the ROTC qualifying examination.

Where the number of contracts to be awarded is for any reason limited, those candidates with the highest qualifications will receive contracts for advanced training.

## ACADEMIC CREDIT IN MILITARY TRAINING FOR EX-SERVICEMEN

Students who have completed one year of service in the Armed Forces of the United States on active duty are exempt from further military training and may be given academic credit of four semester hours for basic ROTC.

Students who have completed six months (under RFA 1955) but less than one year of active duty in the Armed Forces of the United States will be given academic credit for the first year of Army ROTC, but will be required to live in the Corps of Cadets. Such students may be given academic credit for two semester hours of Army basic ROTC. (Credit for six months' training does not apply to the Air Force ROTC.)

Students who have served for at least one year in the Armed Forces of the United States on active duty and who hold a commission are exempt from further military training and may be given academic credit of sixteen semester hours for basic and advanced ROTC.

A student wishing to receive such credit should file a photostatic or certified copy of his discharge with the Registrar's Office so that appropriate credit may be allowed.

## ENGLISH CONFERENCES

Students enrolled in courses in English composition are required to attend conferences with their instructors.

## ASSEMBLIES

In most of the teaching divisions of the College, students are required to attend assemblies at intervals during the session. Prominent speakers are presented at the assemblies for the discussion of topics of general and special interest.

## THE GRADING SYSTEM

Since one comes to college for an education, his grades are usually taken as an indication of the proficiency of his endeavors. The student's semester grade in a course is based upon recitation, written exercises and tests, laboratory work, and the final examination. The final examination has a weight of one-fourth of the final grade, and the proportionate weight assigned to each of the other factors is determined by the head of the department administering the course.

There are four passing grades signifying various degrees of achievement, and grade points are awarded on the basis of these grades.

| Grade | Description | Range (Inclusive) | Grade Points per Semester Hour |
|---|---|---|---|
| A | Excellent | 92-100 | 3 |
| B | Good | 84- 91 | 2 |
| C | Fair | 76- 83 | 1 |
| D | Passing | 70- 75 | 0 |

The lowest passing grade is 70. There is one failing grade, F, below 70, indicating work of unsatisfactory quality. Credit for a course failed may be obtained only by satisfactorily repeating the course in class, except that in a course including both theory and practice, the head of a department may excuse a student from repeating the practice if his grade in the practice is B or better, and if in the judgment of the head of the department the repetition is not necessary. The student must register for both theory and practice, however.

The temporary grade "Inc." (Incomplete) indicates that the student has satisfactorily completed the course with the exception of a major quiz, final examination, or other work. This grade is given only when the deficiency is due to authorized absence or other cause beyond the control of the student and when the work already done has been of a quality acceptable for the satisfactory completion of the course. The privilege of completing such work is limited to the end of the first month of his succeeding semester in college; otherwise the student must repeat the course in order to receive credit, unless for good reason his dean grants an extension of time.

Permission to remove a semester grade of "Inc." received because of absence from a quiz or examination may be granted by the head of the department only on receipt of official notice that the absence was authorized or evidence that the cause for the absence prevented making normal preparation to take the quiz or examination before the close of the semester.

When a student resigns or is dropped from the College after the first two weeks of a semester, the Registrar calls for his grades and enters on his permanent record the symbol WP after each course in which he is passing and WF after each course in which he is not making a passing grade. All WF's and F's will be taken into account in determining his grade point ratio thereafter unless for cause the Executive Committee directs otherwise.

The semester grade in a subject which a student is required to drop on account of failure to keep up with the work is F.

### REPETITION OF A COURSE TO IMPROVE GRADE

Any student who wishes to repeat a course to improve his grade in that course must do so before he completes a more advanced course in the same subject-matter field.

### GRADE POINT RATIO

A student's grade point ratio for any period is computed by dividing the total number of semester hours for which he received grades into the total number of grade points earned in that period. Grades of WF and F are included, but grades of WP are excluded.

Only the record made in course work for which the student was registered in this institution is used in determining his grade point ratio.

## GRADE REPORTS

**Preliminary Report:** A preliminary report of the student's progress is sent to the parent or guardian about eight weeks after the beginning of each semester.

**Semester Reports:** At the close of each semester, a report of the student's work during the semester is sent directly to the parent or guardian.

**Unsatisfactory Work:** During the session the deans receive reports from the members of the teaching staff on students doing unsatisfactory work. These reports form the basis for personal conferences with the students concerned and for special notices to parents and guardians.

**Reports to High Schools:** At the close of the first semester, a report is sent to each accredited high school showing the grades made by the freshmen entering the College from that school.

## DISTINGUISHED STUDENTS

A student who completes a semester schedule of at least 15 hours with no grade lower than C and with a grade point ratio of not less than 2.25 for the semester shall be designated as a "Distinguished Student". In official acknowledgment of the designation, he is issued a Distinguished Student card by the dean of his school.

As a recognition of his scholastic achievement, the College allows a Distinguished Student to present his card to the instructor during the next succeeding semester after he distinguishes and, without requirement or privilege of making up the work missed, absent himself from any theory class except for announced quizzes provided, however, that any student who without permission of the instructor leaves a class to which he has reported shall be given a grade of zero for the day's work. This privilege may be revoked for cause at any time by the dean of the student's school.

## HONORARY SCHOLASTIC SOCIETIES

Students ranking near the top of their class scholastically will be considered for admission to one or more of the national honorary societies described below. The honor societies are intended to reward the student of character and ability, and membership in them is a well-recognized mark of distinction which becomes a part of one's permanent record.

**Alpha Pi Mu.** This fraternity is a national industrial engineering society. Eligibility for membership is limited to juniors in the upper fifth of the industrial engineering class, and to seniors in the upper third, together with demonstrated qualities of leadership, ethicality, sociability, and breadth of interest.

**Alpha Zeta.** This is the oldest national agricultural honor fraternity in the country. Election to membership is limited to junior and senior students in agriculture who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Chi Epsilon.** Civil engineering students may be elected by the present membership to this national honorary scholastic fraternity. It is open to junior and senior students who have a scholastic rank in the upper one-third of their class with an appropriate grade point ratio as defined in the membership requirements of the society.

**Eta Kappa Nu.** Electrical engineering majors are eligible for membership in this national honor society. It is open to junior students in the top one-fourth of their class and to senior students in the top one-third of their class.

**Iota Lambda Sigma.** This fraternity is a national society open to all industrial education majors. Students are required to have an overall grade point average of 1.50, and of 2.00 in industrial education courses for membership. Its objectives are to encourage and develop scholarship, leadership, and a professional pride among industrial education students.

**Phi Eta Sigma.** Election to this freshman honor society is automatic upon attainment of a grade point ratio of 2.50 or better in all freshman work for one semester or more. The individual must have carried an academic load of at least 13 semester hours and must not have transferred more than 20 hours from another college.

**Phi Kappa Phi.** Open to all academic fields in the undergraduate school, this honor society elects its membership from those students who are within a year of graduation in a four-year course and are within the top one-tenth of their class scholastically. The student must have been registered one year in the College to be eligible. Graduate students with outstanding records who have satisfied the residence requirement are also eligible for membership.

**Phi Lambda Upsilon.** This is the oldest national chemical honor fraternity in the country. Election to membership is limited to junior, senior, and graduate students in chemistry and chemical engineering who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Phi Zeta.** Students in the School of Veterinary Medicine who rank in the upper ten per cent of the junior class or upper twenty-five per cent of the senior class and who have a grade point ratio of at least 2.25 in their entire veterinary curriculum through the preceding semester are eligible for election to this honor society.

**Sigma Gamma Tau.** Aeronautical Engineering students may be elected by the present membership to this national honorary scholastic fraternity. The minimum grade point ratio is 2.00 for eligibility for this society.

**Sigma Pi Sigma.** Students elected to membership in this national physics honor society must attain high standards of scholarship, outstanding achievement in physics, and promise of professional merit. A minimum grade point average of 2.00 and a grade of B or better in an advanced physics course is required for eligibility.

**Sigma Xi.** The object of this society is to encourage original investigation in science, pure and applied. It is open to graduate students and to staff members of the A. and M. College System who have shown a marked excellence in one or more departments of pure or applied science and given evidence of an aptitude for scientific research.

**Tau Beta Pi.** Students in the School of Engineering who rank in the top one-eighth of the junior class or top one-tenth of the senior class are eligible for election to this society. This is the oldest national engineering society founded for the purpose of recognizing scholarship.

## SCHOLASTIC PROBATION

Whenever a student's cumulative record indicates that he is failing to make satisfactory progress, he is considered as scholastically deficient. The cause of the deficiency will be investigated by the dean of his school, and the student may be placed on scholastic probation of such terms as the dean shall designate, or he may be required to withdraw from the College if the deficiency warrants.

Scholastic probation is a conditional permission for a student to continue in school after he has become scholastically deficient or after he has incurred an excessive number of unauthorized absences. This permission is granted by the dean of the student's school when an analysis of the deficiency indicates that a continuation is in the best interests of the student and the College.

## CLASSIFICATION

Sophomore, junior, and senior classification will be granted on completion of 30, 60, and 95 semester hours respectively.

## EXCESS HOURS

A student may register for the regular semester program in his curriculum if he is in good standing. With the dean's approval, necessary adjustments for minor irregularities may be authorized up to 20 hours. Registration for 21 hours or more may be approved under the following conditions:

| Hours | Grade Point Ratio Last Semester or Overall |
|---|---|
| 21 | 1.50 |
| 22 | 2.00 |
| 23 | 2.25 |
| 24 | 2.50 |

The normal amount of work a student may carry in a six-week summer term is 6 semester hours (or 7 if part is practice). Hours in excess of a normal load may be authorized in certain cases by the student's dean in conformance with the limitations that apply during the academic year. For the entire summer session the maximum number permissible is 15 semester hours.

# TRAINING FOR GOVERNMENT SERVICE

## Government Employment

The United States Government employs many college graduates trained in specialized fields of engineering, agriculture, and the natural and social sciences for assignment either at home or abroad. In some instances experience is a desirable or necessary qualification for federal employment. Within fixed limits graduate study is normally accepted as the equivalent of experience. Except for positions of high rank, employment is on the basis of competitive examinations. Information concerning these opportunities and Civil Service examinations to qualify for them is readily obtainable from any United States Post Office or from the Civil Service Commission, Washington 25, D.C.

## Agricultural Foreign Service

Recently many specialists in agriculture have been appointed to administer technical programs of the United States in foreign countries. In addition to their own field of specialization, such technically trained candidates will often find some knowledge of foreign language (French, German, Portuguese, Russian, or Spanish) useful. They should likewise command a good knowledge of our own language, government and history, and economics. Students who are interested in such a program should at the earliest possible date confer with the Dean of Agriculture and the head of the subject matter department of major interest in order to work out a satisfactory degree program.

## The Foreign Service of the United States

Superior students who plan to take the examinations for career officers in the Foreign Service of the United States are urged to consult the Head of the Department of History and Government or the Dean of Arts and Sciences. In general they should follow a broad program of study with emphasis on English, foreign languages, history and government, economics, mathematics and statistics, literature, geography, anthropology, and similar courses. Those primarily interested in Latin America might refer to the paragraph on Latin American studies in the School of Arts and Sciences for some specific suggestions. Besides the general examinations on the reading of English and on vocabulary, on statistics and mathematics, on general knowledge, and on written English, candidates take special examinations on world or United States history and government, economics, and modern languages.

## PREPARATION FOR TEACHING

Teacher education is an important part of the college curriculum, so much that it is a college-wide enterprise. The Council on Teacher Education, an administrative body, comprised of representatives from all departments engaged in teacher education, gives general direction to the institutional program. All of the teacher preparation programs are fully certified and meet the standards set forth by the State of Texas.

Students who decide on a career in teacher education will find the field offers many challenging opportunities for advancement. The good teacher should possess a keen desire to work understandingly with youths, their parents, and his professional associates.

A student may prepare for teaching by selecting a program in one of four departments of the College. These are the Department of Agricultural Education in the School of Agriculture; the Department of Education and Psychology and the Department of Health and Physical Education, both in the School of Arts and Sciences; and the Department of Industrial Education in the School of Engineering.

The student may choose a first and second teaching field from among those listed below:

**First Teaching Field**

Agricultural Education
Biology
Chemistry
English
Health and Physical Education
History
Industrial Arts Education
Industrial Vocational Education
Journalism
Mathematics
Modern Languages
Physics

**Second Teaching Field**

Biology
Business Administration
Chemistry
Driver Education
English
General Science
History
Journalism
Mathematics
Modern Languages
Physics

An approved graduate program is available to those who wish to do additional work in either the Departments of Agricultural Education, Industrial Education, or Education and Psychology. A minor program is offered by the Department of Health and Physical Education. Professional programs are approved for certification of superintendents, principals, supervisors, counselors, visiting teachers, and master teachers within subject-matter areas.

The Placement Office of the College endeavors to assist graduates and students of the College in securing suitable teaching positions and to assist boards of education and other officials in securing teachers. The Placement Office makes every effort to place candidates who register for the service in good positions. Information obtained from professors and others is confidential. No charge is made for this service.

### Education and Psychology

The Department of Education and Psychology coordinates the programs of teacher preparation in the academic areas commonly taught in the high school. Teaching majors or minors may be obtained in biology, chemistry, English, history, journalism, mathematics, modern foreign languages, physics, and business administration.

Students may choose to major in the Department of Education and Psychology or in the college department representing their subject-matter specialty. In either case the student must complete a 24-hour sequence in his principal teaching area and an 18-hour sequence in a second teaching area, or he must select a 48-hour approved program in the broad field of social studies or of natural sciences. In addition 24 hours of courses in education and psychology will be required for certification. Majors in the department itself will take 6 additional hours of professional education and will follow the four-year program outlined in the section of this catalogue devoted to the School of Arts and Sciences.

The Department offers a graduate program leading to the Master of Education or Master of Science degree. It prepares students for professional certification as master teachers or as superintendents, principals, supervisors, counselors, or visiting teachers. Certification at the professional level requires three years of teaching experience in addition to graduate level training.

### Health and Physical Education

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; or (3) athletic trainer. Students completing the prescribed curriculum will be eligible for the Provisional All Grade Level Certificate in Health and Physical Education and a Provisional Secondary Certificate.

### Agricultural Education

Training provided in Agricultural Education prepares the prospective teacher to operate a program of vocational agriculture as an integral part of the high school educational system. Agricultural education majors may also qualify for a second teaching field in science. The curriculum in agricultural education provides a well-rounded education in areas involving teacher-student and teacher-community relationships, science, technical agriculture, and general education.

Courses involving teacher-student and teacher-community relationships offered in the agricultural education curriculum are educational psychology, principles of agricultural education, course building for in-school youth, Future Farmer and Young Farmer activities, adult education, methods of developing supervised farming programs, student teaching in vocational agriculture, and agricultural journalism. These courses are designed to develop basic educational philosophies, methods of selecting problems to be taught, and methods of teaching in-school youth, young farmers, and adult farmers.

Thirty semester hours involving science are included in the agricultural education curriculum. This exceeds the number of hours required for a teaching certificate in science.

A minimum of 58 semester hours in technical agriculture is required for agricultural education graduates. This provides an opportunity for the graduate to have a knowledge of the technical agriculture that is essential for successfully teaching vocational agriculture.

General education receives emphasis in the agricultural education curriculum. This includes courses in English, history, government, mathematics, and economics. This training prepares the prospective high school teacher of vocational agriculture to operate an efficient educational program in agriculture. Since this educational program includes both high school students and adult farmers, the prospective teacher must be technically and professionally competent.

### Industrial Education

The Department of Industrial Education offers two options in teacher preparation. Qualified students may pursue any of the courses of study described below with reasonable assurance of being able to secure a position in the field for which they have prepared.

#### Industrial Arts Education

Graduates of this curriculum may become industrial arts teachers in the junior and senior high schools of the State. (Industrial arts in these schools includes general shop, electrical work, woodwork, technical drawing, plastics, ceramics, leather, and other craft courses.) The industrialization of the Southwest has created many outstanding opportunities for the prospective industrial arts teacher.

### Vocational Industrial Education

The vocational industrial teacher education option in the industrial education curriculum is intended for teachers, supervisors, and directors for the vocational industrial schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, a candidate for a degree must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan. The Head of the Department of Industrial Education will assist the student in the preparation of his degree plan.

# COUNSELING AND GUIDANCE SERVICE

## Purposes

The Counseling and Testing Center provides testing, counseling, and guidance services to students and related consultative services to the faculty and staff.

## Counseling

At the Center a student will find professionally qualified counselors with whom he can discuss in confidence problems of a personal, vocational or educational nature. A student may request help of the Counseling and Testing Center, or he may be referred by a proper representative of the college, a parent, or other interested persons.

Counselors help the student better understand himself in order that his decisions—educational, personal, and vocational—will reflect maturity of judgment and a realistic appraisal of his abilities, interests, and aptitudes.

## Guidance

The group guidance program assists college students with problems which are common to most students—such as the choice of a course of study, how to study in college, improvement of college reading abilities, and a survey of fields of knowledge. A student may enroll voluntarily in any group guidance course of his choice, or he may be recommended for such a course by an advisor or counselor. These courses each carry one hour of college credit and may be used as electives in degree programs.

**Basic 102. College Reading:** This laboratory course is designed to help students improve their reading rate, comprehension, and vocabulary.

**Basic 103. College Study:** This course is designed to help students to develop more effective study skills, time schedules, note-taking, examination skills, and basic textbook study methods. The course is not a tutoring course, but it will emphasize methods of efficient study.

**Basic 105. The World of Work:** This is a course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas are studied intensively, and each student is given an opportunity to study his aptitudes and interests, and to relate them to various vocational requirements.

Basic 105 is a required course for General Curriculum students, those students who are interested in attending A. and M. but have not decided upon a major field of study. In cooperation with the Dean of the School of Arts and Sciences, who administers the General Curriculum program, a counselor from the Counseling and Testing Center helps the student plan his program at some time prior to his registration for the first semester.

**Basic 106. Survey of Man's Knowledge:** This is a course recommended for the student who has his vocational goal more clearly in mind. The course acquaints the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature are investigated.

## Vocational Reading Room

For the use of students in the General Curriculum program and other students who are investigating vocations, a Vocational Reading Room is provided. Here up to date and objective information is maintained about most vocational fields. In addition, the student can be referred to professors on the campus who train students in the different professions and vocations.

## Remedial Services

Individual assistance is available for those with special difficulties in spelling, handwriting, functional vision and hearing, written expression, and problems in taking examinations. The Center also offers help to those students with minor speech disorders which do not require extensive treatment.

### Testing Service

Effective for those entering in September 1963, all beginning freshmen will be required to submit a report of the results of their College Entrance Examination Board Tests to be used by the Counseling and Testing Services in connection with the student's placement in his academic program. This requirement bears no relationship to a student's admission to the College who otherwise meets stated admission requirements. While a student's placement for the fall semester of 1962 will be based upon his high school record and tests administered at this college, he is urged to submit to our Counseling and Testing Center the results of any tests administered by the College Entrance Examination Board. The CEEB Tests will include the Scholastic Aptitude Test and Achievement Test in Mathematics and English with additional tests to be administered by the Counseling and Testing Center on the campus.

For 1962 the College will maintain its existing testing program both for group testing and individual testing.

During the summer months a number of two-day counseling and testing clinics are offered on the campus. These clinics will offer the student the opportunity to take additional tests and have a group interpretation made. Also in a conference with his academic dean or faculty advisor his own scores will be interpreted to him and his program planned for his first semester. Many other valuable experiences will be offered to the students in these two-day clinics. Parents are urged to accompany the students and opportunity will be provided for them to participate in certain of these activities. Further information regarding the clinics can be obtained by contacting the Director of the Counseling and Testing Center.

### The A. and M. Adjunct

The A. and M. Adjunct is a summer school with a camp atmosphere for students entering college for the first time. The college has developed a beautiful campsite of 411 acres on the South Llano River in the heart of the Texas Hill Country, about one mile from Junction, Texas. Two six week terms are offered each summer.

A well rounded program for each student includes classwork, study, and recreation. The student takes seven hours of regular college work, usually college English, college math, and physical education. Teachers and counselors are available to help the student with problems that may arise.

At the first of each term every student is given a comprehensive group of tests. This group consists of aptitude, achievement and interest tests which aid the counselor in helping the student decide upon his course of study for the summer term and his future course of study to follow in college.

An organized inter-cabin competitive intramural program is offered. Also, swimming, canoeing, and fishing activities are conducted in the cool, clear water of the South Llano River. An outdoor amphitheater is available for variety shows, motion pictures, and group meetings.

The A. and M. Adjunct is administered by the Counseling and Testing Center through the Dean of Instruction. In almost every case staff members come from the regular faculty of the A. and M. College. The Center works closely with the departments who offer courses in the instructional program. Students interested in this program should write or contact the Director of Admissions.

**General Curriculum.** The general curriculum is designed to meet the needs of the new student who has not decided upon a major field of study. It is arranged to assist the student in evaluating himself and in evaluating the several possible degree objectives, and at the same time to afford general courses that have application in almost all curricula. A student who decides upon his major field of interest by the beginning of the second semester may declare his degree objective and register for the courses outlined in that curriculum. If a student has not decided upon his degree objective by this time, he is advised to continue with the General Curriculum for the second semester.

## GENERAL CURRICULUM

| First Semester | Th Pr | Cr |
|---|---|---|
| **Basic 105**<br>The World of Work | (0-2) | 1 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics** | | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 7 |
| **Physical Education 101** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 10 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

Assignment to the specific courses listed above will be made in conference with a member of the faculty and in accord with the student's achievement. The courses designated as mathematics and elective will be assigned in line with the requirements of the curriculum in which the student expresses greatest interest. General Curriculum students are under the academic supervision of the Dean of the School of Arts and Sciences.

As a part of the elective hours, a student may take either Biology 101, 107, 108, or Chemistry 101, 102 in the first and second semesters. Chemistry is required or is acceptable in more curricula than biology. A student evidencing a deficiency in mathematics may be required to delay chemistry a semester.

A student whose high school record and entrance tests indicate inadequate preparation may be required to register for either a reduced load or special courses designed to meet his need.

# THE SCHOOL OF AGRICULTURE

The various curricula in the School of Agriculture have as their main objectives the preparation of young men for farming, ranching, and other businesses associated with agriculture; for harvesting, processing, and marketing of food and fiber products; for the pursuit of scientific investigation in the broad field of agriculture, including soils, water and plant and animal products, both native and cultivated; for careers in teaching or extension work in agriculture; for work with various governmental and private agricultural agencies; or for the teaching of conservation and management of our natural and cultivated resources. Systematic training is given in the sciences of chemistry, physics, mathematics, and biology, all of which are fundamental to the study of scientific agriculture. The curricula offered give the student a wide range of choice in the selection of a major, and elective courses provide excellent opportunity for enlarging his field of learning in keeping with his individual interest and needs.

## CURRICULA

- Agricultural Economics
  - Agricultural Administration Option
  - Farm Management Option
- Agricultural Education
- Agricultural Engineering
- Agricultural Journalism
- Agronomy
- Animal Husbandry
  - Commercial Option
  - Production Option
- Animal Science
- Dairy Science
  - Manufacturing Option
  - Production Option
- Entomology
- Floriculture
- Food Technology
- *Forestry
- Horticulture
- Plant and Soil Science
- Poultry Science
- Range Management
- Sociology
  - Human Relations Option
  - Rural Leadership Option
- Wildlife Management
  - Fisheries Option

*The present curriculum includes the first two years of forestry only.

## Curricula in
## AGRICULTURAL ECONOMICS

Trained personnel are needed in agricultural economics in the fields of marketing and price analysis, farm and ranch management, land economics, agricultural policy, and finance and consumer economics.

### Agricultural Administration Option

The program in agricultural administration prepares students for employment with governmental and private agencies; in such positions as research workers, marketing specialists, agricultural agents of banks and business firms; as extension workers; and as salesmen and teachers. Electives in business administration prepare students for work in businesses related to agriculture. Electives in technical agriculture prepare a student who wishes to become a specialist in the marketing of a particular farm product.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying<br>**Or** | (2-2) | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management<br>**Or** | (2-2) | |
| **Agricultural Economics 452**<br>International Trade and Agriculture | (3-0) | 3 |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 447**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Agricultural Economics 430**<br>Agricultural Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. AGRICULTURAL BUSINESS ADMINISTRATION: Students preparing for work with business concerns allied with agriculture should elect from 9 to 18 credit hours of work in business administration and economics.
2. AGRICULTURAL MARKETING: Students preparing for work in agricultural marketing should elect from 9 to 18 hours in courses dealing with the production, grading, and marketing of commodities.
3. AGRICULTURAL ECONOMICS: Students preparing for professional work in agricultural economics and expecting to take graduate training should elect courses in the various social sciences, including courses in advanced economic theory.
4. Not more than 6 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.

## Farm Management Option

The program in farm management prepares students for the operation of farms and ranches and for professional and commercial work dealing with agriculture. Electives in technical agriculture permit students to emphasize the study of particular agricultural enterprises.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying<br>**Or** | (2-2) | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records and Accounts | (2-2) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Elective** | | 1 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 432**<br>Farm and Ranch Organization and Operation | (2-2) | 3 |
| **Agricultural Economics 447**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Not more than 9 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.
2. Other electives shall be selected with view to strengthening the student's preparation for farm operation and closely related agencies and businesses.

## Curriculum in
## AGRICULTURAL EDUCATION

This curriculum, which includes well balanced selections in various areas of technical agriculture, is designed to give the teacher of vocational agriculture the preparation and training in both technical agriculture and professional education, including student teaching, required to qualify under the Texas Education Agency State Plan for Vocational Education.

In addition to being qualified to teach vocational agriculture graduates of this curriculum find employment with the Agricultural Extension Service and the Soil Conservation Service, in agricultural public relations work with banks, with Chambers of Commerce and news gathering and reporting agencies, and with industries related to agriculture.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 325**<br>Farm Electricity | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Education 301**<br>Principles of Agricultural Education | (3-0) | 3 |
| **Agricultural Engineering 221**<br>Farm Shop | (1-3) | 2 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Government 305**[3]<br>Government of the United States and Texas | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Education 427**<br>Methods of Developing Farming Programs | (1-2) | 2 |
| **Agricultural Engineering 222**<br>Farm Shop | (1-3) | 2 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Agronomy 308**<br>Forage Crops | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 20 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Education 431**<br>Student Teaching in Vocational Agriculture | (2-0) | 2 |
| **Agronomy 318**<br>Soil Conservation | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Education 425**<br>Course Building | (2-0) | 2 |
| **Agricultural Education 426**<br>Methods in Adult Agricultural Education | (2-0) | 2 |
| **Agricultural Education 432**[4]<br>Student Teaching in Vocational Agriculture | (2-6) | 4 |
| **Animal Husbandry 416**<br>Livestock Management | (1-2) | 2 |
| **Dairy Science 420**<br>Dairy Management | (1-2) | 2 |
| **Poultry Science 401**<br>Management and Selection | (1-2) | 2 |
| **Elective** | | 3 |
| | | 17 |

NOTES:
1. Electives shall be selected and substitutions made with the advice of the Head of the Department.
2. Students who do not have credit for three hours of Basic ROTC must take Government 306 and 307 in place of Government 305.
3. Laboratory hours in Agricultural Education 432 are to include six weeks of student teaching.

### Curriculum in

## AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is under the joint supervision of the School of Agriculture and the School of Engineering. Agricultural engineering deals with the application of the fundamental branches of engineering to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The term "agricultural engineer" denotes an engineer who has been trained in both engineering and agriculture, with experience in combining the two, and who is qualified to develop, design, organize, and direct engineering work in agriculture and closely allied industries.

In general, agricultural engineering may be broken down into five major phases of activity: power and machinery; agricultural structures design; farm electrification; agricultural process engineering; and soil and water control and conservation, which includes drainage, flood control, irrigation, and soil erosion control.

Graduates of this curriculum are prepared for service in teaching, extension, and research work; with government soil and water control projects; with manufacturers of farm equipment in advertising, sales, and design work; with engineering and contracting firms; with agricultural processing industries; and with building and equipment manufacturers.

Students who expect to enter the agricultural engineering curriculum and are not thoroughly grounded in the fundamentals of algebra and trigonometry are urged to attend a six-week term of summer school prior to the fall semester of the freshman year and take courses in algebra and trigonometry equivalent to Mathematics 102 and 103 at the A. and M. College of Texas. Those students who enter the fall semester's work not prepared to take Mathematics 121 should replace Mathematics 121 and History 105 in their fall schedule with Mathematics 102 and 103. Before the end of the fall semester, these students should contact the Head of the Department of Agricultural Engineering for specific instructions and a degree plan.

## For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Agricultural Engineering 208**<br>Farm Machinery | (2-3) | 3 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 301**<br>Agricultural Structures Design | (2-3) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 16 |

| | | |
|---|---|---|
| **Agricultural Engineering 324**<br>Agricultural Engine and Tractor Design | (2-3) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Agricultural Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
|  |  | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 208**<br>Farm Machinery | (2-3) | 3 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
|  |  | 17 |

### JUNIOR YEAR

|  |  |  |
|---|---|---|
| **Agricultural Engineering 301**<br>Agricultural Structures Design | (2-3) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
|  |  | 18 |

|  |  |  |
|---|---|---|
| **Agricultural Engineering 324**<br>Agricultural Engine and Tractor Design | (2-3) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineerng 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
|  |  | 17 |

### SENIOR YEAR

|  |  |  |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** |  | 3 |
|  |  | 18 |

|  |  |  |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Agricultural Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
|  |  | 16 |

## Curriculum in
## AGRICULTURAL JOURNALISM

The curriculum in agricultural journalism is designed to prepare students for professional careers as agricultural writers and editors, including work on bulletins and magazines as well as on rural and metropolitan newspapers, and in radio-TV broadcasting.

The first two years are planned to give students the fundamental studies. The program gives students an adequate background for general journalistic work and affords them opportunities to prepare themselves as specialists in certain phases of agricultural writing.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Journalism 201**<br>News Writing | (2-3) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 | **Journalism 311**<br>Radio and Television News Writing | (2-2) | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 | **Journalism 315**<br>Photography | (1-3) | 2 |
| **Elective** | | 4 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Journalism 410**<br>Publications Editing and Designing | (1-3) | 2 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 | **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 | **Elective** | | 7 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

NOTE: Electives shall be selected and substitutions made with the advice of the Head of the Department. Electives shall include at least 10 hours of advanced courses in agriculture.

## Curriculum in
## AGRONOMY

The program in agronomy prepares students for work in the broad fields of soil management and crop production. Agronomic training gives the student a thorough understanding of the basic sciences and, in addition, teaches him how to apply this knowledge in the improvement of crops and soils. The first phase of training includes such subjects as mathematics, chemistry, botany, entomology, bacteriology, genetics, and plant physiology. Specialized courses in plant and soil science, which emphasize efficient crop production practices and the conservation and improvement of our soils, are provided in the last two years of the curriculum.

The agronomy graduate is well trained in those subjects dealing with crops and soils and is qualified for the numerous activities related to his field of training. Professional opportunities include those in farming, farm management, and land appraisal; in fertilizer manufacture and sales, seed companies, grain marketing and milling, and agricultural equipment and supply businesses; in extension and education as county agents, extension specialists, college instructors, agricultural public relation specialists and agricultural editors and directors; and in technical fields with the Agricultural Experiment Stations, United States Department of Agriculture and Soil Conservation Service.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Liberal Arts 311**<br>Use of Library Resources | (0-2) | 1 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products<br>Or | (3-0) | |
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agronomy 306**<br>Grain and Fiber Crops | (3-2) | 4 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 10 |
| | | 18 |

NOTES:

1. Electives shall be selected and substitutions made with the advice of the Head of the Department.
2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curricula in

## ANIMAL HUSBANDRY

The Department of Animal Husbandry offers training for the future producers, processors, extension personnel, and scientists of the livestock industry.

The Animal Industries Building houses the offices, classrooms, meats laboratory, library, and some of the research facilities of the Department. The Department farm of 1,280 acres is adjacent to the campus and maintains purebred herds of cattle, swine, sheep, and horses for use in teaching, research, and extension. Additional grade and crossbred cattle are located at the College plantation a short distance from the campus. Modern barns and equipment are utilized in teaching the latest methods of production and marketing. A complete meats laboratory is equipped to slaughter, process, and preserve all classes of livestock. Student help in the department is utilized to the fullest extent to provide students with financial assistance as well as valuable experience in handling livestock.

Through the proper choice of elective courses, students may form a foundation for graduate study in either curriculum option. However, the interdepartmental animal science curriculum is planned especially for students preparing for graduate study.

## Commercial Option*

The commercial option is designed to meet the needs of future meat plant operators, feed industry personnel, livestock market personnel, pharmaceutical representatives, and related agricultural interests. Courses are offered in accounting, personnel management, business law, and psychology, in addition to the basic animal husbandry courses. Elective courses are selected with the aid of the departmental advisor.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 | **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Animal Husbandry 307**<br>Meats | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **English 203**<br>Introduction to Literature<br>**Or** | (2-0) | |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Veterinary Anatomy 202**<br>Veterinary Anatomy | (1-6) | 3 |
| | | 17 | **Elective** | | 3 |
| | | | **Physical Education 202** | (0-2) | R |
| | | | | | 19 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 | **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 5 | **Elective** | | 5 |
| | | 18 | | | 18 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Animal Husbandry 437**<br>Marketing and Grading of Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry (Elective)** | | 3 | **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Elective** | | 9 |
| **Elective** | | 3 | | | |
| | | 18 | | | 18 |

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*Students are required to take at least one animal husbandry production course: Animal Husbandry 406, 412, or 414.

## Production Option*

The production option is designed to meet the needs of future ranch managers, breed association fieldmen, county agents, livestock buyers, farm and ranch reporters, and related agricultural groups. The student will take courses in agronomy, range and forestry, animal breeding, and veterinary medicine as well as courses in animal husbandry. Elective courses are selected by the student with the aid of the departmental advisor.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 307**<br>Meats | (2-3) | 3 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | |
| Or | | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Veterinary Anatomy 202**<br>Veterinary Anatomy | (1-6) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records<br>and Accounts | (2-2) | |
| Or | | 3 or 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 |
| **Elective** | | 3 or 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 309**<br>Feeds and Feeding | (2-2) | 3 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

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*Students are required to take at least one animal husbandry production course: Animal Husbandry 406, 412, or 414.

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering (Elective)** | | 3 |
| **Agronomy 308**<br>Forage Crops<br>Or | (2-2) | |
| **Range and Forestry 401**<br>Range Improvement<br>and Maintenance | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 437**<br>Marketing and Grading of<br>Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Veterinary Parasitology 487**<br>Parasites of Farm Animals<br>and Poultry | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## Curriculum in
## ANIMAL SCIENCE

Those who complete the curriculum in animal science will be qualified for graduate work in the fields of nutrition, animal breeding, genetics, physiology of reproduction, zoology, bio-statistics, and related fields. At the same time they are qualified for many of the positions available to graduates with a major in one of the animal curricula in the School of Agriculture.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Animal Husbandry 107**[1]<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective**[2] | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 217**<br>Comparative Anatomy<br>of Vertebrates<br>**Or** | (2-4) | |
| **Biology 343**<br>Histology | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

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|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 410**[3]<br>Introductory Biochemistry | (3-3) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Biology 433**<br>General Physiology | (3-3) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Genetics 406**<br>Statistics | (2-2) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 9 |
| | | 17 | | | 17 |

NOTES:
1. Dairy Science 202 or Poultry Science 201 may be substituted.
2. Entomology 201 or 208 or Chemistry 226 is recommended.
3. Animal Husbandry 303 plus 1 hour of elective, or Poultry Science 411 may be substituted.
4. The student planning further study in animal husbandry, biochemistry and nutrition, dairy science, genetics, or poultry science should select suitable elective courses with the advice of the head of the appropriate department.

## Curricula in
## DAIRY SCIENCE

Trained personnel are much in demand to aid, service, manage, and direct the production, manufacture, and distribution of milk and dairy foods so important in the human diet.

### Dairy Manufacturing Option

This major is designed to prepare students for dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; merchandising and sales. Fundamental technical and business courses give a well rounded preparation for careers in the dairy industry and allied fields.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**[1]<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Entomology 201**[1]<br>General Entomology | (2-2) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Dairy Science 307**<br>Judging Dairy Products | (0-2) | 1 |
| **Dairy Science 311**<br>Technical Control of Dairy Products | (2-6) | 4 |
| **Dairy Science 316**<br>Butter and Cheese Manufacture | (3-4) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Dairy Science 410**<br>Dairy Plant Management | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| Or | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Dairy Science 407**<br>Ice Cream Manufacturing | (2-3) | 3 |
| **Dairy Science 415**<br>Condensed and Powdered Milk | (2-2) | 3 |
| **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

NOTES:
1. Students who expect to major in dairy manufacturing may substitute Mathematics 103 or 110 for Poultry Science 201 or Entomology 201.
2. Electives shall be selected and substitutions made with the advice of the Head of the Department.
3. At least 16 but not more that 26 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

### Dairy Production Option

This major is designed to prepare students for careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding, or management; as extension dairy specialists and organization leaders and as workers in allied fields.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**[1]<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 |
| **Dairy Science 303**<br>Dairy Cattle Judging | (0-3) | 1 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Agronomy 308**<br>Forage Crops | (2-2) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Dairy Science 417**<br>History and Development of Dairy Cattle | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Dairy Science 324**<br>Commercial Dairy Products | (3-0) | 3 |
| **Dairy Science 418**<br>Feeding and Management of Dairy Cattle | (3-2) | 4 |
| **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTES:

1. Students who expect to major in dairy production may substitute Mathematics 103 or 110 for Poultry Science 201.
2. Electives shall be selected and substitutions made with the advice of the Head of the Department.
3. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## ENTOMOLOGY

The program in entomology is intended to prepare students for careers in either research, extension, teaching, business, or industry. The curriculum includes basic studies in insect taxonomy, morphology, physiology, toxicology, and economic entomology. It also includes fundamental subject matter in the various fields of agriculture as well as in the biological sciences.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 | **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** |  | 6 | **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
|  |  |  | **Elective** |  | 3 |
|  |  | 18 |  |  | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## FLORICULTURE

Floriculture is that branch of agriculture concerned with the production, distribution, marketing, and landscape use of ornamental plants and plant products.

The program in floriculture includes sound preparation in such sciences as botany, soils, entomology, and genetics to enable a graduate to breed, propagate, and distribute improved varieties of ornamental plants, and to arrange and maintain them properly in landscape developments.

Floriculture is a business as well as a science, and the curriculum is designed to provide preparation for the highly technical and specialized growing operations of florist or nursery crop production, as well as specialized training for landscape activities, and for positions in associated industries requiring sales people, floral designers, managers, executives, and experts in the packing, shipping, and storage operations connected with flower crops and nursery stock. Opportunities for employment also exist in the fields of teaching, research, and extension.

## FRESHMAN YEAR

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
|  |  | 16 |  |  | 16 |

## SOPHOMORE YEAR

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
|  |  | 17 |  |  | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Floriculture 327**<br>Principles of Floriculture | (2-2) | 3 |
| **Floriculture 319**<br>Exotic Plants | (2-2) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Elective** | | 12 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 | | | 18 |
| **Elective** | | 5 | | | |
| | | 18 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Floriculture 425**<br>Landscape Maintenance<br>and Construction | (3-3) | 4 |
| **Floriculture 424**<br>Propagation of Ornamental Plants | (2-2) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Elective** | | 11 |
| **Elective** | | 10 | | | 18 |
| | | 18 | | | |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Landscape Horticulture: Students preparing for a career in landscape horticulture should elect from 9 to 18 credit hours in landscape architecture.
2. Floriculture: Students preparing for careers in commercial floriculture and nursery management should elect 9 to 18 hours in plant, soil, and crop sciences.
3. Plant Science: Students preparing for professional work in floriculture and landscape horticulture and expecting to take graduate work should elect courses in the various plant sciences, chemistry, and entomology.

## Curriculum in
## FOOD TECHNOLOGY

The curriculum in food technology is designed to train students in the technical and scientific problems of food processing and manufacturing. This course of study includes a number of elective hours, enabling the student to take major work in production, processing, inspection, and grading of dairy products, fruit and vegetable products, and miscellaneous foods and beverages. Students majoring in this curriculum are under the supervision of a committee on food technology, appointed from the agricultural teaching staff by the Dean of Agriculture.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Mathematics 116**<br>Plane Trigonometry and<br>Analytic Geometry | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Elective** | | 5 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 19 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Dairy Science 326**<br>Food Bacteriology | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 7 | **History 326**<br>History of Texas | (3-0) | 3 |
| | | 19 | **Elective** | | 3 |
| | | | | | 19 |

NOTE: Students enrolled in food technology will select an option in meat, dairy, horticulture, or poultry products and, with the counsel of a member of the Food Technology Committee, will prepare a plan of study for his approval.

## Two-Year Curriculum in

## FORESTRY

The two-year curriculum in forestry provides the student with fundamental courses necessary for him to enter a Southern accredited school of forestry with junior standing. In addition to the arts and sciences, the curriculum includes the basic courses of plane surveying, agronomy, ecology, and forestry. The curriculum provides the fundamentals for study in the propagation, protection, and management of commercial timbers, the processing and manufacture of wood products, and the conservation of all products derived from forests. All accredited Southern forestry schools have approved the curriculum as adequate to permit the student to obtain his Bachelor of Science degree in forestry upon the completion of two additional years of study. The Texas Legislature has provided funds which are available to defray certain out-of-state expenses for Texas students who attend accredited Southern forestry schools for the junior and senior years.

During the junior and senior years, the forestry student has the opportunity to specialize in forest production, forest utilization, wood technology, pulp and paper technology, wood products merchandising, or extension and public relations forestry.

A degree from an accredited school of forestry prepares the graduate for work in the fields of forest administration, management, research, and education.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 | **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 18 |
| | | 18 | | | |

NOTE: Students who complete this two-year curriculum may continue their work for a degree in forestry in any accredited Southern forestry school. Funds have been appropriated by the Texas Legislature to help defray certain out-of-state expenses for Texas students attending such schools for their junior and senior years.

## Curriculum in HORTICULTURE

This program includes fundamental courses and specialized training in fruit growing, vegetable growing, plant propagation, and the processing of horticultural crops. Graduates are prepared for work as operators and owners of fruit orchards, vegetable farms, nurseries, and commercial processing plants. The training is also valuable for careers in teaching, extension, and research work in horticulture and related fields.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Horticulture 311**<br>Processing Horticultural Crops | (2-3) | 3 |
| **Horticulture 322**<br>Vegetable Crops Management | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## SENIOR YEAR

| | Th Pr | Cr |
|---|---|---|
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Horticulture 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 8 |
| | | 18 |

| | Th Pr | Cr |
|---|---|---|
| **Entomology 405**<br>Horticultural Pests | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## PLANT AND SOIL SCIENCE

The curriculum in plant and soil science is designed to give students a technical background for the fields of plant breeding, plant pathology, plant physiology, turf management, soil fertility, soil physics and mineralogy. At the same time students are qualified for many other positions available to graduates with a major in one of the other plant curricula in the School of Agriculture.

The curriculum emphasizes the sciences of botany and chemistry but also gives a firm foundation in English and other liberal arts, and in agricultural courses.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 12 |
| | | 18 |

NOTE: Students must select all electives with the advice of the Head of the Department in which they expect to take their major work.

## Curriculum in
## POULTRY SCIENCE

The growth of the poultry industry and the need for a rapid expansion of scientific and technical knowledge in the various fields of science basic to successful poultry production have supplied the motivation for the development of courses in this phase of agriculture. In no field of agriculture is an understanding of the science and practice of feeding, breeding, physiology, pathology, heating, ventilation, processing, and marketing more necessary or more rewarded than in the modern intensive methods of producing poultry meat and eggs. Undergraduate students are trained to operate commercial poultry farms, hatcheries, feed mills, and poultry processing plants. They also find employment with such allied industries as feed manufacturers, equipment distributors, and manufacturers of vaccines and biologics, with poultry publications, and with the Extension Service. Many graduates in poultry science choose to take graduate work in this and allied fields.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Poultry Science 411**<br>Poultry Feeding | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Poultry Science 303**<br>Turkey Production | (2-0) | 2 |
| **Poultry Science 308**<br>Hatchery Management | (2-3) | 3 |
| **Veterinary Microbiology 334**<br>Poultry Diseases | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Poultry Science 309**<br>Broiler Production | (2-2) | 3 |
| **Poultry Science 407**<br>Technology and Marketing of Poultry and Poultry Products | (2-2) | 3 |
| **Poultry Science 414**<br>Poultry Breeding | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Poultry Science 482**<br>Poultry Seminar | (1-0) | 1 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## Curriculum in
## RANGE MANAGEMENT

This curriculum is designed to give students a thorough understanding of the great variety of problems met in the multiple use and conservation of noncultivated grazing lands. The first phase of training includes work in the physical, biological, and social sciences. Specialized courses in range management, range ecology, agrostology, forestry and conservation of natural resources are included in the last two years.

Graduates are prepared to enter the ranch business as owners or managers, for work as county agricultural agents, for work with Experiment Stations, and as college teachers in this field. A Bachelor's degree in range management gives the student the background for study toward advanced degrees. Men meeting Civil Service requirements are eligible for appointment with several United States Government agencies.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 309**<br>Agricultural Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Range and Forestry 303**<br>Agrostology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 308**<br>Forest Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Animal Husbandry 406**<br>Beef Cattle Production | (2-2) | |
| Or | | 3 or 4 |
| **Animal Husbandry 414**<br>Sheep, Goats, and Fiber Technology | (3-2) | |
| **Range and Forestry 304**<br>Range Management | (2-3) | 3 |
| **Range and Forestry 309**<br>Silvics and Silviculture | (2-3) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 6 or 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economcis 422**<br>Land Economics | (3-0) | 3 |
| **Agronomy 310**<br>Soil Morphology | (1-3) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| Or | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Range and Forestry 409**<br>Advanced Range Management | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

## Curricula in

## SOCIOLOGY

Trained personnel are needed in sociology in the fields of population analysis, anthropology, social psychology, community development and social work.

### Human Relations Option

The program affords professional training in human relations with special emphasis on social problems, community development, social anthropology, social work, criminology and juvenile delinquency, population, institutions, and group organization. Graduates are qualified for employment as case workers, Chamber of Commerce directors, probation or parole officers, and Boy Scout executives.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Geography 201**<br>Principles of Geography | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 203** | (2-0) | 2 |
| Introduction to Literature | | |
| **Government 306** | (3-0) | 3 |
| American National Government | | |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207** | (3-0) | |
| General Psychology | | |
| Or | | |
| **Psychology 301** | (3-0) | 3 |
| Educational Psychology | | |
| **Sociology 205** | (3-0) | 3 |
| Principles of Sociology | | |
| **Elective** | | 6 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 227** | (3-3) | 4 |
| Principles of Accounting | | |
| **Economics 203** | (3-0) | 3 |
| Principles of Economics | | |
| **English 210** | (2-0) | 2 |
| Introduction to Logical Discourse | | |
| **Military or Air Science** | (0-3) | 1 |
| **Sociology 206** | (3-0) | 3 |
| Social Institutions and Processes | | |
| **Elective** | | 5 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Education 321** | (3-0) | |
| Secondary School Methods | | |
| Or | | |
| **Psychology 323** | (3-0) | 3 |
| Psychology of Adolescence | | |
| **Liberal Arts 301** | (3-0) | 3 |
| Introduction to Philosophy | | |
| **Sociology 306** | (3-0) | |
| Principles of Social Work | | |
| Or | | |
| **Sociology 314** | (3-0) | 3 |
| Social Problems | | |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 303** | (3-3) | 4 |
| Statistical Method | | |
| **Journalism 406** | (3-0) | 3 |
| Publicity and Public Relations | | |
| **Sociology 320** | (3-0) | 3 |
| Social Anthropology | | |
| **Sociology 412** | (3-0) | 3 |
| Population Analysis | | |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 406** | (3-0) | 3 |
| Sanitation and Public Health | | |
| **Civil Engineering 408** | (3-0) | 3 |
| Municipal Administration | | |
| **English 403** | (1-2) | 2 |
| Speaking for Professional Men | | |
| **Sociology 311** | (3-0) | 3 |
| Social Psychology | | |
| **Sociology 404** | (3-0) | 3 |
| Rural Community Development | | |
| **Sociology 481** | (1-0) | 1 |
| Seminar | | |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429** | (3-0) | 3 |
| Agricultural Policy | | |
| **Business Administration 422** | (3-0) | 3 |
| Personnel Problems of Industry | | |
| **Sociology 430** | (3-0) | 3 |
| Sociological Theory | | |
| **Elective** | | 9 |
| | | 18 |

NOTE: All electives must be approved by the Head of the Department. Not more than 9 elective credit hours of advanced courses in sociology may be applied toward requirements for graduation.

### Rural Leadership Option

This program affords professional training in rural leadership. Training is given in both the human side and the technical side of agriculture for students preparing to become county agricultural agents, participants in foreign agricultural programs, rural ministers, agricultural missionaries, and leaders in rural development programs.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Dairy Science 202**<br>Dairying | (2-2) | |
| **Or** | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Sociology 320**<br>Social Anthropology | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Range and Forestry 401**<br>Range Improvement and Maintenance | (2-3) | 3 |
| **Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | |
| Or | | |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Sociology 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 315**<br>The Family | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

NOTE: Not more than 9 elective hours of advanced courses in sociology may apply toward graduation.

## Curriculum in
## WILDLIFE MANAGEMENT

This curriculum includes work in all phases of fisheries and wildlife. At the beginning of the sophomore year, the student should elect one of the two options, fisheries or wildlife, because of difference in the basic sciences required. The junior and senior years are largely years of specialization.

This curriculum is designed (1) to train young men in the art of managing wildlife on the land and of maintaining populations at levels consistent with good land-use practices and the desirability of the wildlife species involved; (2) to train men for research in taxonomy, distribution, and ecology of fishes, reptiles, amphibians, birds, and mammals; and (3) to train men for teaching at the high school and university levels. Opportunities are provided also, in cooperation with the Departments of Journalism and of Education, for training in the field of wildlife journalism and conservation education. For students planning on careers in research and/or teaching at the college level, an advanced degree will be required.

Upon completion of the wildlife management curriculum, graduates are prepared to enter occupations in the fisheries and/or wildlife fields, including management, research, teaching, and public relations. Men meeting Civil Service requirements are eligible for appointments with the United States Fish and Wildlife Service and other federal agencies. Also, graduates are eligible for employment by the various state game and fish commissions. A few positions are open from time to time as wildlife managers on private ranches and as writers of articles on outdoor life.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water ) | (2-3) | 3 |
| **Elective** | | 6 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Elective** | | 6 |
| | | 19 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 408**<br>Techniques of Wildlife Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## Fisheries Option

## FRESHMAN YEAR

(Same as for Wildlife Management, page 139.)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Wildlife Management 312**<br>Ichthyology (Marine) | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Wildlife Management 417**<br>Biology of Fishes | (2-2) | 3 |
| **Elective** | | 7 |
| | | 17 |

| | | |
|---|---|---|
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 410**<br>Conservation and Management of Fishes | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTES:

1. Electives shall be selected and substitutions made with the advice of the Head of the Department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

3. Majors in the wildlife management option must participate in the summer field course, Wildlife Management 300, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

4. Majors in the fisheries option must participate in the summer field course, Wildlife Management 400, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

# THE SCHOOL OF ARTS AND SCIENCES

## CURRICULA

### DIVISION OF BUSINESS ADMINISTRATION

- Accounting
- Building Products Marketing
- Finance
- General Business
- Insurance
- Marketing
- Personnel Administration

### LIBERAL ARTS

- Economics
- English (Language and Literature)
- History
- Journalism
- Mathematics
- Modern Languages
- Pre-Law

### PSYCHOLOGY AND PREPARATION FOR TEACHING

- Psychology
- Education
- Physical Education

### SCIENCE

- Botany
- Chemistry
- Entomology
- Meteorology
- Microbiology
- Physics
- Premedical and Predental Program
- Zoology

### COMBINED DEGREE PLAN

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees. The student contemplating such a program should have a two-year grade point ratio above the normal minimum requirements and should consult with the heads of both departments and the deans concerned prior to formulating a combined degree plan.

### REQUIREMENT OF PROFICIENCY IN WRITTEN ENGLISH

In order to qualify for candidacy for a degree in the School of Arts and Sciences, all students majoring in departments of this school (Division of Business Administration; Departments of Biology, Chemistry, Economics, Education and Psychology, English, Health and Physical Education, History and Government, Journalism, Mathematics, Modern Languages, Oceanography and Meteorology, and Physics) must first demonstrate their ability to express themselves in acceptable English by passing a written examination in English composition. This examination must be taken not later than the spring semester of the junior year. Each student who fails to make a passing grade on a qualifying examination will be required to report to the Department of English for assignment for remedial work, which the student must complete satisfactorily without degree credit. Only if the Department of English has certified satisfactory completion of such remedial work and the student has passed his examination will the student be granted regular status as a candidate for a degree.

### ELECTIVES

In all curricula, elective hours are shown distributed over several semesters (one, two, or more a semester). The student is not expected to schedule his elective courses only in the units listed. He is free to schedule electives in whatever units he chooses up to and beyond the total number of elective hours in his curriculum. A student will normally be expected to take electives in accordance with his academic classification.

It is recommended that most of the elective courses be in fields other than the major, and that the student take at least one course outside his major field during each semester of his junior and senior years. For example, where possible a student in one of the curricula in business administration should choose electives outside the Division of Business Administration; the major in science should elect courses in the humanities and social sciences; and students in economics or history should elect courses in the natural sciences, in the humanities, and in business administration.

## LATIN AMERICAN STUDIES

A number of departments offer courses relating to Latin America, so that it is possible for many students (including some who are registered in the other schools of the College) to combine some concentration in Latin American studies with their regular department major. The program of offerings on Latin America is designed to meet the needs of four classes of students: (1) those who expect to enter into business in Latin America or into trade with Latin America; (2) those who contemplate a career in the foreign service of the United States Government or in any of the several government agencies in Washington which employ specialists on Latin America, with assignments both in the United States and in the foreign field; (3) those who expect to enter into teaching or research with emphasis upon Latin America; and (4) those who wish to broaden their education and acquire a better understanding of the people and the problems of Latin America. Any student who elects to coordinate some study of Latin America with a regular major in one of the College departments should consult the head of his major department for guidance in working out his program of study.

Those courses which bear directly on Latin America include the following:

| | | |
|---|---|---|
| **Geography 201**<br>Principles of Geography | (3-0) | 3 |
| **Geography 303**<br>Geography of South America | (3-0) | 3 |
| **History 313**<br>The Latin-American Nations to 1820 | (3-0) | 3 |
| **History 314**<br>The Latin-American Republics, 1820 to the Present | (3-0) | 3 |
| **History 422**<br>International Rivalry in the Gulf-Caribbean Area, 1840 to the Present | (3-0) | 3 |
| **Modern Language 305**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 306**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 325**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 326**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 335**<br>Spanish-American Novel | (3-0) | 3 |
| **Modern Language 336**<br>Spanish-American Novel | (3-0) | 3 |

## Curricula in
## DIVISION OF BUSINESS ADMINISTRATION

The several curricula in the Division of Business Administration provide training for business careers. The freshman year is the same in all curricula with the exception of building products marketing. A student who plans to major in building products marketing follows a separate course of study beginning with his freshman year. Other students elect a major field at the beginning of the sophomore year choosing one of the following: accounting, finance, general business, insurance, marketing, personnel administration.

Each curriculum contains courses essential to a general education and permits the study of fundamental business theory and procedure with limited specialization in one of the major fields. Upon the completion of his chosen curriculum, the student receives the degree of Bachelor of Business Administration.

## FRESHMAN YEAR

(For Accounting, Finance, General Business, Insurance, Marketing, Personnel Administration)

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102[1]**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Science[2]** | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

NOTES: 1. Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the capabilities of the student. Mathematics 101 does not carry degree credit.

2. Students may select any one of the following: Chemistry 106, Geography 203,

## Curriculum in
## ACCOUNTING

The curriculum in accounting offers a professional course of training for employment in commercial and industrial accounting, public accounting, or governmental accounting. Positions in these fields are generally designated as accountant, public accountant, certified public accountant, tax accountant, auditor, cost accountant, internal auditor, and controller. The basic business training obtained in this curriculum also qualifies graduates for employment eventually leading to executive positions in industry.

### FRESHMAN YEAR

(See above.)

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 329**<br>Elementary Cost Accounting | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Elective** | | 5 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 328**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 332**<br>Cost Accounting | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 5 |
| | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 306**<br>Business Law | (3-0) | 3 | **Business Administration 402**<br>Accounting Systems | (2-0) | 2 |
| **Business Administration 330**<br>Advanced Accounting | (3-0) | 3 | **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 407**<br>Auditing | (3-0) | 3 | **Business Administration 406**<br>Managerial Accounting<br>Or | (3-0) | |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 408**<br>Auditing | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Elective** | | 10 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

## Curriculum in
## BUILDING PRODUCTS MARKETING

The curriculum in building products marketing was developed in cooperation with the retail building materials industry, the Lumberman's Association of Texas, and the National Retail Lumber Dealers Association. It is designed to train persons who plan to seek employment in the building materials industry. The curriculum provides an educational foundation for responsible positions in this industry.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 | **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 16 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Engineering 205**<br>Materials in Light Structures | (2-3) | 3 | **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 216**<br>Building Products | (0-2) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Engineering Graphics 221**<br>Building Construction Drawing | (1-3) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Physics 211**<br>A Brief Survey of Physics | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 329**<br>Elementary Cost Accounting | (3-0) | 3 | **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 4 |
| **Elective** | | 4 | | | 17 |
| | | 17 | | | |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 315**<br>Insurance | (3-0) | 3 | **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 461**<br>Retailing Building Products | (2-0) | 2 | **Business Administration 428**<br>Real Estate Titles<br>and Conveyances | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Elective** | | 7 |
| **Elective** | | 4 | | | |
| | | 18 | | | 18 |

NOTE: A minimum of 12 weeks of practice in the industry is required. This practice is to be approved in advance, and suitable reports are to be submitted on each assignment.

## Curriculum in
## FINANCE

The curriculum in finance provides instruction in the principles and institutions of finance with training in the techniques and practices of financial management. The courses in accounting, economics, business law, and elective fields provide a balanced background for careers in finance.

An objective of the program is to prepare students for managerial positions in such fields of business finance as commercial banking, investment banking, securities brokerage, trust management, and property management. The program also provides training for employment with governmental agencies engaged in lending operations and regulation of securities markets.

### FRESHMAN YEAR
(See page 143.)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 | **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 | **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 4 | **Elective** | | 6 |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 | **Business Administration 432**<br>Security Analysis | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 | **Business Administration 434**<br>Problems in Finance | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 | **Economics 412**<br>Public Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Elective** | | 9 |
| **Elective** | | 6 | | | |
| | | 17 | | | 18 |

## Curriculum in
## GENERAL BUSINESS

Students who do not wish to major in one of the several special fields in business administration may follow the curriculum in general business. This curriculum includes one or more courses in each of the fields of business administration and thereby provides a broad training for business careers. It is designed for those planning to establish their own business or preparing for employment eventually leading to responsible positions in industry.

### FRESHMAN YEAR

(See page 143.)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## Curriculum in
## INSURANCE

The insurance industry is seeking an increasing number of college graduates for positions as agents, agency managers, underwriters, claim adjusters, payroll auditors, safety engineers, and executives. The insurance field includes life, property, and casualty insurance, and corporate suretyship. The curriculum in insurance is designed to provide the training for students who plan to enter this field, whether on their own account, with insurance companies, or with business or industrial concerns.

### FRESHMAN YEAR

(See page 143.)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 322**<br>Property Insurance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 320**<br>Life Insurance | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 324**<br>Casualty Insurance<br>and Suretyship | (3-0) | |
| **Or** | | |
| **Business Administration 437**<br>Applied Life Insurance | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 427**<br>Insurance Law | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## Curriculum in
## MARKETING

The field of marketing is diversified in the scope of its opportunities. Typical of the fields in which expansion is taking place is retail merchandising. Its major departments include store management, buying, publicity, merchandise planning, research, and personnel work. Market research will make increased demands upon those able to furnish management with the data necessary to keep abreast of marketing changes, to eliminate wasteful marketing methods, and to develop new products. The field of sales administration requires an ever-increasing number of individuals qualified to recruit, select, and train selling personnel. Also in this area lie the important functions of establishing sales territories, setting sales quotas, and sales costing. Personal selling is a field offering many opportunities for employment. In the field of advertising a student may gain added proficiency by electing advertising courses taught in the Department of Journalism.

By careful selection of electives, a student can specialize in one of the different fields of marketing or gain general knowledge in anticipation of starting his own business.

### FRESHMAN YEAR

(See page 143.)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **Geography 204**<br>Economic Geography | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 16 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 | **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 344**<br>Marketing Problems | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 445**<br>Marketing Research | (3-0) | 3 | **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 5 |
| | | 17 | | | 17 |

## Curriculum in
## PERSONNEL ADMINISTRATION

The curriculum in personnel administration provides training for employment in the personnel departments of industrial concerns, public institutions, and governmental agencies, especially those agencies concerned with employer-employee relations. In recent years employer-employee relations have become a major problem of business and society, with the result that there is an increasing demand for qualified college graduates to work in this important field.

### FRESHMAN YEAR

(See page 143.)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 205**<br>Marketing | **(3-0)** | **3** |
| **Business Administration 227**<br>Principles of Accounting | **(3-3)** | **4** |
| **Business Administration 316**<br>Office Management | **(2-0)** | **2** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Psychology 303**<br>Psychology for Technical Students | **(3-0)** | **3** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **18** |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | **(3-3)** | **4** |
| **Business Administration 305**<br>Business Law | **(3-0)** | **3** |
| **Business Administration 315**<br>Insurance | **(3-0)** | **3** |
| **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **16** |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | **(3-3)** | **4** |
| **Business Administration 306**<br>Business Law | **(3-0)** | **3** |
| **English 301**<br>Writing for Professional Men | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Elective** | | **4** |
| | | **17** |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | **(3-0)** | **3** |
| **Business Administration 418**<br>Corporation Finance | **(3-0)** | **3** |
| **Business Administration 422**<br>Personnel Problems of Industry | **(3-0)** | **3** |
| **Economics 318**<br>Economics of Labor | **(3-0)** | **3** |
| **Elective** | | **6** |
| | | **18** |

### SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 423**<br>Personnel Policies and Techniques | **(3-0)** | **3** |
| **Business Administration 435**<br>Salesmanship | **(3-0)** | **3** |
| **Economics 435**<br>Economics of Collective Bargaining | **(3-0)** | **3** |
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Journalism 321**<br>Industrial Journalism | **(2-2)** | **3** |
| **Elective** | | **3** |
| | | **17** |

| | | |
|---|---|---|
| **Economics 437**<br>Government and Labor Relations | **(2-0)** | **2** |
| **Industrial Education 328**<br>Industrial Accident Prevention | **(3-0)** | **3** |
| **Psychology 401**<br>Industrial Psychology | **(3-0)** | **3** |
| **Elective** | | **9** |
| | | **17** |

## LIBERAL ARTS

The curricula in liberal arts leading to the degree of Bachelor of Arts offer carefully planned programs of study in selected areas of the humanities and social sciences. They are intended for students whose interests, abilities, and aims are better served by a broad general education than by more specialized technological and scientific studies.

After completing one of these curricula, many students enter directly upon their life work. Others make their liberal arts course the foundation for additional education in a professional or graduate school. Special provision is made for those who wish to begin the study of law before they have completed the program for the Bachelor's degree.

In all of the programs the first two years are given over to introductory work in fundamental subjects. The purpose is to enable the student to attain experience and breadth of view so that he may take a more intelligent part in his own further education. During the last two years the student pursues a major and a minor field of study and appropriate electives, with guidance from the head of his major department and from the Dean of the School of Arts and Sciences.

### MAJOR AND MINOR STUDIES

By April 15 of his sophomore year, the student selects a major and a minor field of study, according to the following directions:

1. One of the following subjects must be chosen as the field of major study: economics, English, history, journalism, mathematics, or modern languages.
2. For his minor study the student may select one of the above subjects other than that of his major study or one of the following: biology, business administration, chemistry, education, entomology, geography, geology and geophysics, government, health and physical education, meteorology, physics, psychology, or sociology.
3. The remainder of the elective work may be taken in any of the areas of study indicated above, or in other departments of the College, subject to the approval of the Dean of Arts and Sciences.
4. To satisfy the requirements for graduation, a student must complete not less than thirty semester hours in his major study, of which at least twelve hours are in advanced courses (above the sophomore level), and not less than eighteen semester hours in his minor study, of which at least six hours are in advanced courses. Upon recommendation of the head of the student's major department, the Dean may authorize the substitution of courses in closely related departments for a limited number of hours in the major or minor study.

### FOREIGN LANGUAGE REQUIREMENT

The student will satisfy the foreign language requirement by completing four semesters of study in one language.

### THE SOPHOMORE SCIENCE REQUIREMENT

A student whose curriculum includes a sophomore science requirement may satisfy this requirement in one of three ways:

1. Normally, he will schedule any two (one each semester) of the following survey courses: Chemistry 106, Geography 203, Geology 205, Physics 211.
2. Alternatively, he may substitute for the two survey courses any two-semester course in chemistry or physics.
3. By special permission of the Dean, he may be allowed to substitute the first semester of the usual two-semester introductory course in chemistry, geology, or physics for the survey course in that science. This last provision is intended to prevent unnecessary duplication in the program of students changing from one curriculum to another or transferring from another institution with science credit equivalent to an introductory rather than a survey course.

## Curricula in LIBERAL ARTS

### FRESHMAN YEAR

(For Economics, English, History, and Modern Languages)

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**[3]<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 2 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

NOTES: 1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.

2. See "The Foreign Language Requirement," page 150.

3. Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## Curriculum in ECONOMICS

Most students who major in economics enter upon a business career following their graduation. These students obtain a broad foundation for such a career by combining a judicious selection of courses in business administration with those prescribed in their major program. Other students find it desirable to obtain an undergraduate degree with a major in economics before entering law school. Still others pursue the four-year course in preparation for graduate study leading to careers in teaching, research, or government service.

### FRESHMAN YEAR

(See above)

### SOPHOMORE YEAR[3]

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Economic History**[6] | (3-0) | 3 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 | **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | | **Economics (elective)** | (3-0) | 3 |
| **Or** | | | **Government 306**<br>American National Government | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Elective**[4-5] | | 5 |
| **Elective**[4-5] | | 7 | | | 17 |
| | | 17 | | | |

### SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 410** | (3-0) | 3 | **Economics (elective)** | | 6 |
| Theory of Income and Employment | | | **English 403** | (1-2) | 2 |
| **Economics (elective)** | | 6 | Speaking for Professional Men | | |
| **Elective** | | 8 | **Elective** | | 8 |
| | | 17 | | | 16 |

NOTES:
1. See "The Foreign Language Requirement," page 150.
2. See "The Sophomore Science Requirement," page 150.
3. The student planning his advanced course of study should consult with the Head of the Department sometime during the second semester of his sophomore year to make out his degree plan. There is available a suggested program of work for those who wish to combine a major in economics with Latin American studies.
4. Business Administration 304 or 418 can substitute for three semester hours of economics electives.
5. Junior and senior electives are to be selected after consultation with the student's major advisor.
6. Credit for Economics 319 (Economic Development of the United States) or Economics 320 (Economic Development of Europe) will satisfy this requirement.

## Curriculum in
## ENGLISH

The curriculum in English is designed for breadth in education. In the Department of English, the English major studies writing skills, the language, and literature. Outside of the Department of English, he studies physical and biological sciences, social sciences, foreign language, history, and philosophy. A large part of the program, especially in the junior and senior years, is left to the choice of the student. Through electives the student may extend his knowledge in the humanities, sciences, social sciences, or even technological skills. The curriculum for the English major, then, is suitable not only for the student who expects to continue his studies of the humanities in graduate school but also for the student who expects to go into business or to become a student of law or medicine or religion.

The student desiring both a full professional training and a broad general education may in five years complete the requirements for two degrees—Bachelor of Arts in English and Bachelor of Science in any one of the professional fields. For specific degree plans, which are made out for each individual entering this program, the student should consult the Dean of Arts and Sciences and the dean of any other school in which he seeks a professional degree. (For degrees in English and in Engineering, see page 176.)

### FRESHMAN YEAR

(See page 151.)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203** | (3-0) | 3 | **Economics 204** | (3-0) | 3 |
| Principles of Economics | | | Principles of Economics | | |
| **English 231** | (3-0) | 3 | **English 212** | (3-0) | 3 |
| Survey of English Literature | | | Shakespeare | | |
| **History 213** | (3-0) | 3 | **History 214** | (3-0) | 3 |
| History of England | | | History of England | | |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 309**<br>The English Language | (3-0) | | **English (elective)** | (3-0) | 3 |
| Or | | | **English 322**<br>Nineteenth Century Literature | (3-0) | 3 |
| **English 310**<br>Phonetics and Pronunciation | (3-0) | 3 | **Elective** | | 12 |
| **English 321**<br>Nineteenth Century Literature | (3-0) | 3 | | | 18 |
| **Government 306**<br>American National Government | (3-0) | 3 | | | |
| **Elective** | | 8 | | | |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 407**<br>Speaking and Oral Interpretation | (1-2) | 2 | **English (elective)** | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. See "The Sophomore Science Requirement," page 150.

## Curriculum in
## HISTORY

Through a major in history a student may provide the basis for a broad liberal education, and at the same time find a useful vocation or avocation. History majors find employment opportunities in public school teaching, museum and archives work, state and national park service, diplomatic and consular service, public relations and public information offices, and in writing, research, and bibliographical work.

Many students find it desirable to obtain an undergraduate degree with a major in history and a minor in some related field such as economics, English, government, modern languages, or sociology before entering law school, seminary training, regular military service, and certain careers in industry and government.

The program in history provides excellent preparation for the further study of history beyond the baccalaureate degree.

## FRESHMAN YEAR

(See page 151.)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **History 217**<br>Development of Europe | (3-0) | 3 | **History 218**<br>Development of Europe | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **History (elective)** | | 6 | **History (elective)** | | 6 |
| **Elective** | | 8 | **Elective** | | 9 |
| | | 17 | | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History (elective)** | | 6 |
| **Elective** | | 9 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **History (elective)** | | 3 |
| **Elective** | | 14 |
| | | 17 |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. See "The Sophomore Science Requirement," page 150.

## Curriculum in
## JOURNALISM

Programs for students majoring in journalism are designed to prepare them for futures in the communications field. By the beginning of the junior year, each student determines, with the advice of members of the Department, what special phase of journalism he wishes to emphasize in his own program—community newspapers, urban newspapers, news-editorial work, advertising, business management, industrial writing and editing, radio-TV journalism. A major in agricultural journalism is available for students interested primarily in the field of technical journalism, serving agriculture.

Upon completing the curriculum, most students enter either the news or advertising departments of newspapers or magazines. Other students find opportunities in the radio-television field and in public relations.

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees—the Bachelor of Science degree in a technical field such as Industrial Technology or the Bachelor of Business Administration in Personnel Administration concurrently with the Bachelor of Arts degree in Journalism.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Journalism 201**<br>News Writing | (2-3) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 232**<br>Survey of English Literature | (3-0) | 3 |
| **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 | **Business Administration 205**<br>Marketing<br>**Or**<br>**Business Administration 305**<br>Business Law | (3-0)<br><br><br>(3-0) | 3 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 | **English (elective)**[3] | | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 | **Journalism 306**<br>Newspaper Production<br>and Management | (2-2) | 3 |
| **Elective** | | 8 | **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| | | 17 | **Elective** | | 4 |
| | | | | | 16 |

## SUMMER WORK

Journalism 300; Summer Practice, ten weeks, required.

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English (elective)**[3] | | 2 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 307**<br>State and Local Government | (3-0) | 3 | **Journalism 410**<br>Publications Editing and Designing | (1-3) | 2 |
| **Journalism 409**<br>History and Principles<br>of Journalism | (3-0) | 3 | **Journalism 412**<br>Editorial Writing | (3-0) | 3 |
| **Elective** | | 9 | **Journalism (elective)** | | 3 |
| | | 17 | **Elective** | | 7 |
| | | | | | 17 |

NOTES:
1. See "The Foreign Language Requirement," page 150.
2. The student may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. It is recommended that the student select any one of the following: English 325, 328, 340, 350, 371, 375.
4. The Journalism Department has assembled information on the various areas of emphasis which will prove a valuable guide to a student planning his advanced course of study and choosing his electives at the beginning of the junior year.
5. The Journalism Department, in cooperation with the Texas Daily Newspaper Association, offers a 10-week professional internship program for selected students who have demonstrated superior ability. These internships are available only during the summer following the junior year.
6. For further information on agricultural journalism, see pages 117 and 118.

## Curriculum in
## MATHEMATICS

The curriculum in the Department of Mathematics is designed to give the student a broad liberal education as well as to provide him with the essentials for a career in mathematics.

The demand for pure mathematicians as well as applied mathematicians has recently become very great in industry, government, and university work. This demand is found at the bachelor's, master's, and doctor's levels. The Department of Mathematics offers programs in pure and applied mathematics, including numerical analysis, to help meet this demand.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 16 |
| | | 17 | | | |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 | **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Mathematics (elective)** | | 6 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 |
| **Modern Language**<br>French, German, Russian, or Spanish | (3-0) | 3 | **Elective** | | 5 |
| **Elective** | | 5 | | | 17 |
| | | 17 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Mathematics (elective)** | | 3 |
| **Mathematics (elective)** | | 3 | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

NOTES: 1. The minor field of study should be chosen only after consultation with the Head of the Department of Mathematics, who will help the student arrange a program appropriate to his plans following graduation.

2. Students planning to enter the Graduate School should elect Mathematics 409 and 415.

## Curriculum in
## MODERN LANGUAGES

### FRESHMAN YEAR

(See page 151 with Spanish required as the modern language.)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>Spanish | (3-0) | 3 | **Modern Language**[1]<br>Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Elective** | | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**<br>The English Language | (3-0) | 3 | **English 310**<br>Phonetics and Pronunciation | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Modern Language**<br>Spanish | (3-0) | 3 |
| **Modern Language**<br>Spanish | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Elective** | | 9 |
| **Elective** | | 5 | | | 18 |
| | | 17 | | | |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **History 314**[3]<br>The Latin-American Republics, 1820 to the Present | (3-0) | 3 |
| **History 313**[3]<br>The Latin-American Nations to 1820 | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Modern Language**<br>Spanish | | 2 |
| **Modern Language**<br>Spanish | | 2 | **Elective** | | 9 |
| **Elective** | | 7 | | | |
| | | 17 | | | 17 |

NOTES:
1. See "The Foreign Language Requirement," page 150. Students who take beginning Spanish in their freshman year must elect 6 hours of advanced Spanish in their senior year.
2. See "The Sophomore Science Requirement," page 150.
3. In case of unavoidable conflict with another required course, a substitution in the field of history will be allowed upon approval by the Head of the Department and the Dean of the School of Arts and Sciences.
4. Recommended electives: Advanced courses in economics, English, geography, history.
5. For most students majoring in modern languages, economics, English, history, or geography are logical minors.

## Curriculum in
## PRE-LAW

Students who plan to obtain an undergraduate degree before undertaking the study of law will normally register for one of the regular degree programs. Particularly appropriate are the programs in business administration, economics, English, and history. Students who plan to complete no more than three years of undergraduate work before entering law school will matriculate in the three-year preparatory program listed below. Any student who completes this program may still earn a Bachelor of Arts degree with a major in history and a minor in economics by completing one additional year of course work as follows: 12 semester hours of history selected from History 302, 315, 318 (or 423 and 424), 331, 411, and 421; Economics 321, 324; English 403; and 16 hours of electives, including if possible, Business Administration 303.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 | **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 319**<br>Economic Development of the United States | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 | **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 213**<br>History of England | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Government 308**<br>United States Constitutional Development | (3-0) | 3 |
| **History 214**<br>History of England | (3-0) | 3 |
| **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. To satisfy the requirement in physical science, the student may choose one of the following: Chemistry 101, 102 or Physics 201, 202.

3. The American Bar Association minimum requirement for admission to an accredited law school is three years of acceptable college work. Students who plan to seek admission to a law school after completing the three-year program listed above are strongly advised to check the program with the registrar of the school of their choice before beginning the third year. If necessary to meet specific requirements, substitutions may be approved by the Dean of the School of Arts and Sciences.

Students planning to attend the Law School of the University of Texas must use the 6 semester hours of elective in the junior year for advanced courses (300-400 level) in economics, government, history, or sociology.

4. A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year pre-law curriculum here and at least one year at an accredited law school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

## PSYCHOLOGY AND PREPARATION FOR TEACHING

### Curriculum in

### PSYCHOLOGY

The degree program in psychology provides the necessary background for subsequent professional training at the graduate level, especially in the fields of industrial and experimental psychology. Alternately, it offers a broad scientific base for on-the-job training in the armed services or in industry.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**[1]<br>College Physics | (3-3) | 4 |
| **Psychology 207**[2]<br>General Psychology | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English (Literature elective)** | | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**[1]<br>College Physics | (3-3) | 4 |
| **Psychology (Elective)** | | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 318**<br>Economics of Labor | (3-0) | 3 | **Education 439**[3]<br>Educational Statistics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Psychology 406**<br>Psychology of Learning | (3-0) | 3 |
| **Psychology 309**<br>Differential Psychology | (3-0) | 3 | **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Elective** | | 8 |
| **Elective** | | 6 | | | 17 |
| | | 18 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Psychology 403**<br>Dynamics of Human Behavior | (3-0) | 3 | **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Sociology 311**[3]<br>Social Psychology | (3-0) | 3 | **Psychology 408**<br>Experimental Psychology | (2-3) | 3 |
| **Elective** | | 8 | **Psychology (Elective)** | | 3 |
| | | 17 | **Elective** | | 5 |
| | | | | | 17 |

NOTES:
1. The following substitutions for Physics 201 and 202 may be made with the approval of the student's advisors: 8 additional hours of chemistry; or 6 additional hours of zoology involving laboratory credit, plus 2 hours of elective; or Genetics 301 and 4 hours in physics.
2. Psychology 303 may be substituted for Psychology 207.
3. Education 439 and Sociology 311 will count as hours in psychology.

## EDUCATION: PREPARATION FOR TEACHING

The Department of Education and Psychology offers the following curricula: (1) a curriculum in psychology leading to the degree of Bachelor of Science; (2) a teacher education program in education leading to the degree of Bachelor of Science or Bachelor of Arts. The degree of Bachelor of Arts will require twelve hours of modern language. Students desiring to teach in the public schools may choose to major either in education or in a subject-matter area such as biology or mathematics.

Candidates preparing for work in the teacher education fields should select their courses under the guidance of the departmental advisor. Students beginning their teacher education program after September 1, 1955, will be eligible to receive the provisional certificate upon completing the requirements for the Bachelor's degree and being recommended by the Department to the Texas Education Agency. The Department of Education and Psychology also offers advanced undergraduate and graduate courses in preparation for certification at the professional level as classroom teachers, visiting teachers, counselors, supervisors, principals, and superintendents.

A student majoring in education in the Department of Education and Psychology or working toward the provisional or the professional certificate will be assigned an advisor who will counsel with him during his teacher education program. Education majors in the Department of Education and Psychology will follow the program outlined on pages 161-162.

Students majoring in subject-matter departments and working toward a provisional secondary certificate must meet the minimum requirements described below.

1. Twelve semester hours of professional development in education and psychology on the advanced undergraduate level.
2. Six semester hours in supervised teaching.
3. Forty-eight semester hours in academic specialization.
    a. Twenty-four semester hours in each of two teaching fields (12 semester hours advanced credit in each).
    b. Forty-eight semester hours in a composite field (18 semester hours advanced credit).

4. Approximately two years or fifty per cent of the total four-year program must be in academic foundations including the institutional requirements for the Bachelor's degree. The specific requirements in the arts and sciences include English, 12 semester hours; American history, 6 semester hours; government, 3-6 semester hours; and 12 semester hours from two of the following: science, mathematics, foreign language.

To meet the requirements for the professional certificate, the student must have at least three years of teaching experience and must have completed an approved program of at least thirty semester hours of graduate work beyond the Bachelor's degree requirements.

## PREPARATION FOR TEACHING WITH A MAJOR IN EDUCATION

| | | |
|---|---|---|
| I. Academic Foundations | | 60 hours |
| Biological Science | 6 hours | |
| Economics | 3 hours | |
| English | 13 hours | |
| General Psychology | 3 hours | |
| Government | 6 hours | |
| History | 6 hours | |
| Mathematics | 6 hours | |
| Physical Education | 6 hours | |
| Physical Science | 8 hours | |
| Sociology | 3 hours | |

II. Academic Specialization

Plan 1. The student must complete at least 24 semester hours of concentration in each of two subject-matter areas identified with a field of teaching in the secondary schools (12 advanced hours in each). Teaching fields may be selected from the following: biology, chemistry, economics, English, government, history, journalism, mathematics, modern language, physics, and business administration. The exact courses to be taken will be chosen with the guidance of the student's advisor and the approval of the head of the department concerned.

Plan 2. The student may complete at least 48 semester hours in a composite field such as social studies or natural sciences (18 advanced hours).

| | | |
|---|---|---|
| III. Professional Development | | 18 hours |
| Introductory Education | 3 hours | |
| Educational Psychology | 3 hours | |
| Secondary School Methods | 3 hours | |
| Adolescent Psychology | 3 hours | |
| History and Philosophy of Secondary Education | 3 hours | |
| Secondary School Curriculum | 3 hours | |

| | |
|---|---|
| IV. Professional Laboratory Experiences | 6 hours |

Professional laboratory experiences consist of actual and direct contacts with youth in school, home, and community. They include observations made in connection with courses in psychology, instructional methods, curriculum, and testing. They also include participation in teaching activities during which the student accepts the direct responsibility for the success of a group of youth in a school situation. This experience will be given no earlier than the student's senior year. Application for enrollment in supervised teaching must be made the semester prior to enrollment and approved by the student's advisor.

V. Professional Electives ........................................ 6 hours

The student will be required to take 6 hours of professional development in the field of education or psychology upon the recommendation and approval of his advisor.

VI. Electives

The student will select electives to satisfy the college requirements of a total of 137 semester hours for the Bachelor's degree in Arts and Sciences. These hours will be chosen with the consent of his advisor.

## Curriculum in

## EDUCATION

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**[1]<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry<br>Or | (3-0) | |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 203**<br>Introduction to Literature<br>Or | (2-0) | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 8 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 7 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Education 321**<br>Secondary School Methods | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Education 421**<br>History and Philosophy of Education | (3-0) | 3 |
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 |
| **Education (elective)** | | 3 |
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Education 425**<br>Supervised Student Teaching | (2-12) | 6 |
| **Education (elective)** | | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 3 |
| | | 14 |

NOTES:

1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the capabilities of the student in mathematics. Mathematics 101 does not carry degree credit.
2. With the consent of the student's advisor, the following substitutions may be made in the program outlined above:
   (1) Biological Sciences. A minimum of 6 hours of biological science is required. For Biology 101 and 107, students may substitute Biology 115 (3-3) and Biology 330 (2-0) or Biology 337 (2-0).
   (2) Physical Science. A minimum of 8 hours of physical science is required. For Chemistry 101 and 102, students may substitute Physics 201 (3-3) and 202 (3-3), or select 8 hours from these courses: Chemistry 106 (3-3), Physics 211 (3-3), Geology 205 (3-3), and Geography 203 (3-3).
   (3) Education 121. A student entering upon a certificate or degree program with junior or senior classification may substitute a more advanced course in education for Education 121.
   (4) Physical Education 213, Health Education 415. A student may substitute approved courses in his teaching major or minor for Physical Education 213 and/or Health Education 415.
3. The English elective in the sophomore year should be chosen from literature courses. Students planning to teach English in the secondary schools may substitute for English 203 or 210 a 3-hour English course chosen with the consent of the advisor. If a student writes unsatisfactorily, he may be required to take an additional course in writing, such as English 301.
4. In choosing electives, the student should keep in mind the requirements of his subject-matter area of teaching specialization.

## HEALTH AND PHYSICAL EDUCATION

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; (3) athletic trainer; or (4) corrective therapist. The Bachelor's degree is granted students who complete the prescribed program of studies in professional education, physical education, and general education, and establish a teaching minor in one of the usual secondary school subject matter fields. The choice of a teaching minor may be made only with the approval of the Head of the Department of Health and Physical Education.

Upon completion of the prescribed curriculum and recommendation to the Texas Education Agency, the student will be eligible for (1) the All-Grade Level Certificate in Health and Physical Education and (2) Secondary School Certificate.

### Corrective Therapy

This program is offered in cooperation with the Veterans Administration to prepare specialists in rehabilitation through corrective therapy. This program includes a six-week clinical training period at the Veterans Administration Hospital in Houston. Graduates of this program may be employed by the Veterans Administration, private hospitals, or other organizations concerned with physical rehabilitation.

## Curriculum in PHYSICAL EDUCATION

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**[1]<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Science**[2] | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 219**<br>Mammalian Anatomy | (2-3) | 3 | **Biology 220**<br>Physiology and Hygiene | (2-3) | 3 |
| **Biology 225**<br>Personal and Public Health | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Physical Education 211**<br>Physical Education Activities | (1-3) | 2 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 | **Physical Education 212**<br>Physical Education Activities | (1-3) | 2 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 | **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 | **Health Education 218**<br>Athletic Injuries | (1-3) | 2 |
| **Physical Education 316**<br>Secondary School Physical Education | (3-0) | 3 | **Health Education 421**<br>Elementary School Health Education | (3-0) | 3 |
| **Physical Education 427**<br>Remedial Exercises | (3-0) | 3 | **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 | **Psychology 307**<br>Child Growth and Development | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 6 |
| | | 18 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Education (elective)**[3] | (3-0) | 3 | **Physical Education 423**<br>Administration of Health and Physical Education | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Physical Education 425**<br>Tests and Measurements | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 | **Physical Education 450**<br>Directed Teaching | (2-12) | 6 |
| **Elective** | | 10 | **Elective** | | 3 |
| | | 18 | | | 15 |

NOTES:

1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the capabilities of the student in mathematics. Mathematics 101 does not carry degree credit.
2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. Electives in Education may be chosen from any one of the following: Education 421, 427, 437.
4. History 325, 326 may be substituted for History 105, 106.

## SCIENCE

Science programs in the School of Arts and Sciences are administered by the following departments: Biology, Chemistry, Oceanography and Meteorology, and Physics.

The several curricula in science are planned for those students whose interests and abilities lie in the direction of seeking scientific truths and relations previously unknown or not understood in the world about us and of bringing these truths to bear on problems affecting the well-being of mankind. Because many students do not discover the nature of their interests or abilities until they have followed a curriculum in agriculture or engineering for a year or more, the curricula in science are so arranged that a student may change to science with a minimum of loss in semester hour credit.

The curricula are designed to serve the following purposes:

1. To prepare students for research in basic science, usually after further study at the graduate level.
2. To prepare teachers of science in secondary schools and other institutions of learning.
3. To provide the necessary undergraduate foundation for students planning to study medicine or kindred fields.
4. To afford a broad scientific training for students who desire it before entering some field of applied science in industry or government service.

## Curriculum in

## BOTANY

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Botany elective)** | | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 5 |
| | | 17 |

## Curriculum in
## CHEMISTRY

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 16 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 |
| **Chemistry 226**<br>Chemical Calculations | (2-0) | 2 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 380**<br>Chemical Bibliography | (1-0) | 1 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Elective** | | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| | | 17 | **Elective** | | 3 |
| | | | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Analysis | (2-6) | 4 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 2 | | | 16 |
| | | 18 | | | |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. A program combining the basic requirements for a Bachelor of Science degree in Chemistry with premedical requirements is available. Students completing this four-year program will receive a degree certified by the Americal Chemical Society and at the same time satisfy all the premedical requirements. Mimeographed copies of this program are available at the Department of Chemistry and from the Chairman of the College Premedical Committee in the Department of Biology.

3. The elective hours must include 3 hours of an approved humanities course.

## Curriculum in
## ENTOMOLOGY

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 | **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Elective** | | 3 | **Modern Language**[1] | (3-0) | 3 |
| | | 16 | **Elective** | | 2 |
| | | | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 | **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 4 |
| | | 17 | | | 17 |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. Science electives should usually be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 | **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 | **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 | | | |

## Curriculum in
## METEOROLOGY

Meteorology is the science of planetary atmospheres and their phenomena. Within the broad field of geophysics, it is concerned with physical and chemical processes and states within the earth's atmosphere and at the earth's surface. The objective of terrestrial meteorology is to determine the natural and physiochemical controls of the atmosphere and to apply this knowledge in various ways benefiting life and human endeavor.

Weather and climate through the ages have shaped the physical and biological features of the earth and have guided the course of human activities. However, it is only through quite recent, and continuing, developments in technology, communications, and transportation that sufficient information has been obtained about the atmosphere to enable meteorology to emerge as a separate college study. While satisfying public interest in the weather has been the major object in meteorology, the last few years have witnessed rapidly expanding applications in agriculture, engineering, industry, business, commerce, space exploration and travel, and national defense.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-2) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 16 |
| | | 17 | | | |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| **Elective** | | 1 |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 330**<br>Life Science | (2-0) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 337**<br>Organic Evolution | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Meteorology 317**<br>Meteorological Instruments, Observations, and Communications | (2-3) | 3 |
| **Meteorology 325**<br>Physical Climatology | (3-0) | 3 |
| **Meteorology 335**<br>Atmospheric Statics and Thermodynamics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Meteorology 318**<br>Meteorological Instruments, Observations, and Communications | (1-3) | 2 |
| **Meteorology 326**<br>Regional Climatology | (2-0) | 2 |
| **Meteorology 336**<br>Atmospheric Motions | (3-3) | 4 |
| **Technical Elective** | | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 |
| **Meteorology 457**<br>Fundamentals of Weather Analysis | (1-12) | 5 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Meteorology 458**<br>Weather Analysis | (1-12) | 5 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Technical Elective** | | 4 |
| **Elective** | | 3 |
| | | 17 |

## Technical Electives for METEOROLOGY

| | | |
|---|---|---|
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |

## Curriculum in MICROBIOLOGY

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology (Microbiology elective)**[1] | | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Biology (Microbiology elective)**[1] | | 4 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Liberal Arts**[2] | | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Microbiology elective)**[1] | | 4 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Microbiology elective)**[1] | | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

NOTES:

1. Microbiology electives may be satisfied by Biochemistry and Nutrition 430; Biology 327, 353, 433, 438, 457, 608, 630, 647; Dairy Science 320, 326; Genetics 406; Plant Physiology and Pathology 314. Selections should be made with the aid of the student's advisor.
2. Liberal Arts elective may be satisfied by Liberal Arts 301, 304, or 201 and 311.
3. A program combining the basic requirements for a Bachelor of Science degree in microbiology with pre-medical requirements is available from the Chairman of the College Premedical Committee in the Department of Biology (See page 172).

## OCEANOGRAPHY

Oceanography is the study of the oceans and their boundaries. It is based upon the unity of the sciences of the sea. Effective study of the subject requires thorough previous training in one of the pertinent basic sciences such as biology, chemistry, geology, mathematics, meteorology, and physics, or in engineering. Therefore, much of the work in oceanography is conducted at the graduate level, and the undergraduate program of students who wish to study oceanography must be planned to satisfy certain prerequisite requirements. It is suggested that such students consult regularly during their undergraduate years with the oceanography staff.

Five options, the biological, chemical, geological, physical, and meteorological with their corresponding engineering phases, are offered. The options require different undergraduate programs. These programs are taken in other departments except in the case of meteorological oceanography, where a complete undergraduate program in meteorology is offered in the Oceanography and Meteorology Department.

In the graduate program there are curricula leading to the Master of Science and Doctor of Philosophy degrees in each of the five options in oceanography. Specific prerequisite requirements are set up for each curriculum. In general, these consist of the courses normally required for the degree of Bachelor of Science in one of the basic fields listed above and some course work in each of the other fields.

Oceanography may be utilized in solving certain problems arising in fisheries work, offshore oil and gas operations, navigation, prevention of beach erosion, weather forecasting, recreation, extraction of raw materials from the sea, marine construction, coastal sanitation, military operations, fresh water supply, and many other activities. It requires broad interests, numerous skills, a real liking for the sea, and an adaptability to shipboard life.

## Curriculum in

## PHYSICS

Physics is the science of energy and the interaction of energy and matter. Some physicists are primarily concerned with the discovery and investigation of effects and relations in the physical universe previously unknown or not understood. Others, known as applied physicists, are interested in bringing to the solution of industrial and technical problems, physical effects not previously so applied. When new and better ways are required to obtain and transmit energy or to alter the configuration or constitution of matter, physicists are of service.

Many branches of industry are seeking applied physicists with all levels of professional training from the Bachelor's to the Doctor's degree. Industrial and government-operated research laboratories and colleges and universities are seeking investigators of new physical truths and relations, with professional training beyond the Bachelor's degree. College graduates in physics are far short of the number needed.

The undergraduate curriculum in physics offers a thorough coverage of the phenomena of classical, atomic, nuclear, and solid state physics, while developing the student's mathematical tools to the point where he can deal resourcefully and constructively with these phenomena. It also provides a grounding in related sciences, linguistic techniques, and general education. Elective time permits further broadening of the student's education or a degree of concentration in some phases of engineering.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | **(3-3)** | **4** | **Chemistry 102**<br>General Chemistry | **(3-3)** | **4** |
| **English 103**<br>Composition and Rhetoric | **(3-0)** | **3** | **English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **History 105**<br>History of the United States | **(3-0)** | **3** | **Mathematics 121**<br>Analytic Geometry and Calculus | **(4-0)** | **4** |
| **Mathematics 102**<br>Algebra | **(3-0)** | **3** | **Military or Air Science** | **(0-2)** | **1** |
| **Mathematics 103**<br>Plane Trigonometry | **(3-0)** | **3** | **Physics 218**<br>Mechanics and Heat | **(3-3)** | **4** |
| **Military or Air Science** | **(0-2)** | **1** | **Physical Education 102** | **(0-2)** | **R** |
| **Physical Education 101** | **(0-2)** | **R** | | | **16** |
| | | **17** | | | |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 122**<br>Calculus | (4-0) | 4 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 16 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Physics 301**<br>Heat | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 325**<br>Physics Laboratory | (0-3) | 1 | **Physics 302**<br>Mechanical Properties of Matter | (3-0) | 3 |
| **Physics 401**<br>Optics | (3-0) | 3 | **Physics 326**<br>Physics Laboratory | (0-3) | 1 |
| **Elective**[2] | | 4 | **Physics 413**<br>Electricity and Magnetism | (3-0) | 3 |
| | | 17 | **Elective**[2] | | 2 |
| | | | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Physics 311**<br>Atomic and Nuclear Physics | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 | **Physics 416**<br>Electromagnetic Fields | (3-0) | 3 |
| **Physics 425**<br>Physics Laboratory | (0-3) | 1 | **Physics 424**<br>Physics of Solids | (3-0) | 3 |
| **Elective**[2] | | 7 | **Physics 426**<br>Physics Laboratory | (0-3) | 1 |
| | | 17 | **Elective**[2] | | 6 |
| | | | | | 18 |

NOTES: 1. See "The Foreign Language Requirement," page 150. German or Russian is recommended normally.

2. Electives should be selected in consultation with, and on approval of, the Head of the Department with two objectives in view: (1) to strengthen the broad foundation expected of students who specialize in physics; (2) to intensify the student's program in the direction of a specific competence. For objective (1) are recommended electives in other sciences, especially chemistry; electives in basic engineering courses, such as DC and AC machinery, circuit theory, electronics, engineering mechanics, mechanics of materials, thermodynamics, engineering drawing (Engineering Graphics 105), and machine shop (Mechanical Engineering 309); and electives in mathematics, languages, the humanities, and social sciences.

Objective (2) is determined by the student's interests and plans for the future. He may aspire to a career of advancing knowledge of fundamental physics through basic research on physical phenomena or through college teaching. In this case the student must plan on postgraduate study and should choose his electives to increase his intellectual equipment in mathematics and to widen his range of acquaintance with subjects in physics and other sciences and fields important for an educated man. If the student is interested in research in physics bearing on a field of some other science, such as chemistry, geology, meteorology, oceanography, or biology, a heavy concentration of electives should be made in that science. The student preparing for a career in high school teaching should elect the requisite courses in education. A student planning to go directly into industry upon graduation should concentrate a large portion of his electives in a sequence of courses proceeding to an advanced stage in, for instance, aeronautical engineering, communications and electronics in electrical engineering, or vibrations and the mechanics of materials, or thermodynamics and heat transfer in mechanical engineering.

## Curriculum in
## PRE-MEDICINE AND PRE-DENTISTRY

Students planning to enter a school of medicine or dentistry without first taking a college degree should take the following program:

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (elective)** | | 3 | **Biology (elective)** | | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **Elective** | | 4 |
| | | 19 | | | 19 |

NOTES:

1. Most students admitted to medical and dental schools in the United States have three or more years of pre-professional training. A large proportion hold college degrees. It is therefore recommended that students preparing to enter medical or dental schools plan to complete at least the foregoing three-year program.

2. Four years of college work with the receipt of the baccalaureate degree is the preferred preparation for medical and dental schools. Majors may be obtained in zoology (see page 173) or chemistry (see page 165), and also in physics, microbiology, history, English, and other subjects so long as the requirements for entrance to the professional school are satisfied.

3. A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum here and at least one year at a Class A medical school or dental school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

4. Since courses in literature, language, history, and social sciences are not offered in medical or dental schools, leaders in medical education urge prospective medical and dental students to include much of such work in their preprofessional education. Some electives for the junior and senior years in line with this

recommendation are:

| Course | Th Pr | Cr |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |

Electives available in the sciences related to medicine are:

| Course | Th Pr | Cr |
|---|---|---|
| **Biochemistry and Nutrition 410**<br>Introductory Biochemistry | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Biology 343**<br>Histology | (2-3) | 3 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **Biology 422**<br>Microtechnique | (1-6) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Biology 434**<br>Circulatory and Nerve Physiology | (2-3) | 3 |
| **Biology 435**<br>Advanced Vertebrate Zoology | (3-3) | 4 |
| **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Biology 457**<br>Bacterial Ecology | (2-6) | 4 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Physics 310**<br>Applications of Modern Physics | (2-2) | 3 |

## Curriculum in ZOOLOGY

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (Zoology elective)** | | 3 | **Biology (Zoology elective)** | | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 4 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 7 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 |
| **Elective** | | 12 |
| | | 17 |

NOTES: 1. See "The Foreign Language Requirement," page 150.

2. The elective hours in Zoology must include 12 hours chosen from the following courses: Biology 343, 344, 422, 433, 434, 435, 436.

3. Elective hours and the remaining hours required for the major should be selected from the following:

| | | |
|---|---|---|
| ***Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| ***Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 304**<br>Plant Breeding | (3-2) | 4 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology | (2-3) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |

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*Strongly recommended for all zoology majors.

# THE SCHOOL OF ENGINEERING

## GENERAL STATEMENT

Probably no profession has contributed more to raise the standards of living for mankind and to provide him with the conveniences to make life more enjoyable and the leisure in which to enjoy it, than has engineering. The rapid rate of development in scientific and industrial fields has created a demand for a large number of capable young men in engineering. Today engineering is the second largest profession and employs more men than any other.

The engineer is an applied scientist. It is his responsibility to utilize known laws in the physical sciences and mathematics in ways which make them valuable to mankind. He must understand the physical laws and phenomena and must see how they can be applied. He must conceive the idea, design the product, select the materials, determine the market, plan the production, often design the machines for production, and control costs to the point where the product can be sold at a profit. This involves men, materials, methods, and money.

The present high standards of living in many parts of the world are ample evidence of the work of the engineer. The comforts and conveniences in our homes, the availability of running water, electricity, gas and sewage disposal systems are things that are just taken for granted. The fine automobiles, the excellent highways, the luxurious airplanes, the long range missiles and the orbiting satellites are a few concrete evidences of the work of the engineer. Sometimes known principles and physical laws lie idle and are unused for many, many years before the engineer utilizes them and builds the equipment to make them useful.

Engineering touches nearly every facet of our lives and requires men with depth, breadth, and versatility. Although the fundamental education is the same for all engineers, the field is so broad that specialization is necessary. Usually four years of college are needed to complete the requirements for a Bachelor's degree in some branch of engineering, but some schools are now requiring five. Engineering is becoming more highly technical and involved, and advanced study is highly desirable for those who expect to become specialists of high competence.

Students who expect to enter engineering should make their decision early, so that their courses in both junior high and high school include thorough preparation in mathematics, the physical sciences, English, and the social sciences. Four years of English; two or more years of algebra; a half year of trigonometry; all the geometry, both plane and solid, that is offered; a year each of biology, chemistry, and physics; two years or more in the social sciences; and additional elective credits such as drawing and shopwork form a good foundation. The student should enjoy solving problems, since this is one of the engineer's primary responsibilities.

Employment opportunities for graduate engineers have been quite good for the past 20 years, and it appears that the demand will continue to exceed the supply in the foreseeable future. For those who hold M.S. or Ph.D. degrees, the demand is becoming much stronger and premium salaries are paid for these individuals.

## CURRICULA

### Division of Architecture

Architecture (Five Year Program)
Architectural Construction
(Five Year Program)
Landscape Architecture

**Engineeering**

- Aeronautical Engineering
- *Agricultural Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Geological Engineering
- Geology
- Geophysics
- Industrial Distribution
- Industrial Education
  - Industrial Arts Teacher Education Option
  - Vocational Industrial Teacher Education Option
- Industrial Engineering
- Industrial Technology
- Mechanical Engineering
- Petroleum Engineering
- Petroleum Engineering (Five Year Program)

**Five-Year Combined Degree Plans**

Students who are interested in two areas of engineering or a business foundation to complement their engineering curriculum may pursue programs which lead to two Bachelor's degrees in five years. The following curricula are examples; students interested in other possible combinations should consult with the Dean of Engineering.

Chemical Engineering—General Business
Civil Engineering—General Business
Geology—Petroleum Engineering
**Industrial Engineering
Petroleum Engineering—General Business
Petroleum Engineering—Chemical Engineering
Petroleum Engineering—Geological Engineering
Petroleum Engineering—Mechanical Engineering

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees, the Bachelor of Science degree in a professional field and the Bachelor of Arts degree in one of the liberal arts curricula such as English (see page 96, "Two Degrees"). Other combinations are available such as a five-year combined program in the various industrial education options and journalism, which prepares the student to become an industrial journalist.

## NUCLEAR PROGRAM

The College offers Master of Science and Ph.D. degrees in Nuclear Engineering. An explanation of these plans appears under advanced study.

## ADVANCED STUDY

As the knowledge required for advanced engineering design in industry increases, more and more students are finding it desirable to go beyond the usual four-year course in college. Much of the design in industry today follows the research mode of procedure, the procedure predominantly used in graduate study. Consequently, there has been a growth in graduate study to satisfy the demands of industry for engineers with greater scientific knowledge and research ability. In the future, industry, colleges, and governmental agencies will carry on more and more research, and, therefore, there will continue to be a great demand for engineers with graduate training through the doctorate. It should be pointed out, however, that graduate study is available only to those with more than average ability.

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*Administered jointly by Schools of Agriculture and Engineering.

**A degree of Bachelor of Science in Industrial Engineering may be awarded on the basis of the student's completing the requirements for the degree of Bachelor of Science in Aeronautical, Chemical, Civil, Electrical, Mechanical, or Petroleum Engineering and additional required courses.

Students who are interested in pursuing one of these graduate programs should take the regular undergraduate program in Aeronautical Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Petroleum Engineering, Chemistry, Mathematics, or Physics. The following are recommended as electives for the undergraduate program, with the most important listed first. These courses should be taken only after consultation with the head of the student's major department.

| | |
|---|---|
| Physics 311 | Atomic and Nuclear Physics |
| Nuclear Engineering 401 | Nuclear Engineering |
| Nuclear Engineering 402 | Industrial Applications of Radioisotopes |

An AGN-201 Nuclear Training Reactor is available for use in the nuclear technology work. In the fall of 1961 the 5 megawatt research reactor in the A. and M. Nuclear Science Center became available for student training and research.

Prospective graduate students should write to the Director of Admissions for a Graduate School Catalogue.

## DIVISION OF ARCHITECTURE

### Curriculum in
### ARCHITECTURE

Architecture is the creation of physical space within which people live, work, play, and worship. It is a profession which is dedicated to the betterment of the total man-made physical environment. It is often referred to as the "Impresario of the Arts," and it embraces not only the creation of a single building suited to its needs, including the objects about it, but also entire urban areas involving groups of buildings and even entire cities. The architect, therefore, must not only be able to analyze the general objectives, the specific needs and requirements of the individual or community, but to direct and coordinate the various building operations from design conception to completion of a project.

The Division of Architecture offers a program designed to provide young men with a broad and balanced background of fundamental training for professional careers in architecture. The students are encouraged to develop sensibly and to apply their acquired knowledge and skills to solutions of the social and architectural problems of contemporary society. While they are developing their creative abilities, they are encouraged to acquire full recognition of their professional responsibilities to society.

The curriculum is arranged to integrate the technical aspects of materials, equipment, and construction, as well as the social and cultural aspects of art and history of architecture, with its core program in architectural design. The design courses are further strengthened with other related courses in graphic arts, landscape architecture, working drawings, specifications, and professional practice. Design is taught in a series of stages, beginning with basic design in the first and continued through all years as defined in the courses of instruction. The students are assigned problems to be solved individually or by teams. Individual guidance and criticism are given by the instructor, accompanied with group discussions, lectures, and demonstrations. Further direction is given to the use of reference material in the library. Student work is reviewed and judged by a jury of teachers, practicing architects, and on some occasions, the specialists in a particular project.

The Division of Architecture is a member of the Association of Collegiate Schools of Architecture and is on the approved list of schools accepted by the Texas Board of Architectural Examiners. Its curriculum in architecture is five years in length, leading to a degree of Bachelor of Architecture. The curriculum is accredited by the National Architectural Accrediting Board. Graduates of this program often continue their education in advanced degrees in architecture or in the field of city and regional planning.

## FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 227**<br>Structural Principles | (3-0) | 3 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 301**<br>Design III | (0-15) | 5 |
| **Architecture 305**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 327**<br>Basic Structures | (3-0) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Architecture 302**<br>Design III | (0-15) | 5 |
| **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Architecture 401**<br>Design IV | (0-15) | 5 |
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Architecture 402**<br>Design IV | (0-15) | 5 |
| **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 501**<br>Design V | (0-15) | 5 | **Architecture 502**<br>Design V | (0-15) | 5 |
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 556**<br>City Planning | (2-3) | 3 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Landscape Architecture 411**<br>Landscape Design for the Architect and Engineer | (2-2) | 3 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** |  | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
|  |  | 17 | **Government 306**<br>American National Government | (3-0) | 3 |
|  |  |  |  |  | 16 |

### Curriculum in

## ARCHITECTURAL CONSTRUCTION

The construction of buildings is one of the major industries in the country. Proper training in technical studies of construction methods, materials, structural systems, soils, equipment, cost estimating, business and real estate laws, and labor management forms a good background for those going into the building construction field.

The construction program offered by the Division of Architecture is designed to prepare young men in this field. The curriculum is parallel with the first two years in architecture, with one exception in the mathematics requirement. This offers the student who has not previously made a definite decision an opportunity to make an intelligent choice of the field in which he is most suited. For the next three years, the curriculum is arranged with courses related to the scope of building construction.

The program leads to a degree of Bachelor of Science in Architectural Construction. Graduates in this degree usually enter the building construction industry as draftsmen, estimators, superintendents of construction, and ultimately develop their own firms as building contractors.

Students in this program become members of a very active student chapter of the Association of General Contractors. Through participation in this organization, the students are kept informed of current developments in this field.

## FRESHMAN YEAR

|  |  |  |  |  |  |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Military or Air Science** | (0-2) | 1 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Military or Air Science** | (0-2) | 1 |
|  |  | 17 | **Physical Education 102** | (0-2) | R |
|  |  |  |  |  | 17 |

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Geology 422**<br>Natural Structural Materials | (2-3) | 3 |
| | | 17 | | | 16 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 | **Business Administration 433**<br>Business Management | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 | **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineerng 473**<br>Cost Estimating | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Elective (Humanities)** | | 2 | **Elective (Humanities)** | | 2 |
| | | 17 | | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 554**<br>Professional Practice | (2-0) | 2 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Elective** | | 10 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 | | | 17 |
| **Elective (Humanities)** | | 3 | | | |
| | | 17 | | | |

## Curriculum in
## LANDSCAPE ARCHITECTURE

Landscape architecture is a profession dealing with the art and science of arranging land and water forms and the spaces and objects thereon for the purpose of securing the greatest returns in human use and enjoyment. As in architecture, it is a creative profession concerned with proper and pleasing physical environment. The creative ability of the landscape architect is expressed by his arrangement of forms, the spaces which he produces with land areas for various purposes, his setting of buildings and structures in relation to surrounding topography, and by his use of plant materials, such as trees, shrubs, grasses, and flowers in his design. He must possess an artistic sense, an engineering ability, be skilled in design, have a fundamental knowledge of plant science, and be knowledgeable of the basic elements of land, water, vegetation, and the forces of nature.

The curriculum has been arranged to provide courses which will develop the student logically. Its central core consists of courses in design, the supplementary courses in plant materials, construction, architecture, graphic arts, planning, etc., forming a broad background, together with essential technical training for the professional practice of landscape architecture.

Since the students are physically located with those in architecture, an opportunity is afforded through collaborative problems to establish working relationships which are important to their future professional careers.

The program is four years in length, leading to a degree of Bachelor of Science in Landscape Architecture. Graduates are employed in private practice; by city, state, and regional planning departments; or by city, state, or national park systems. Other opportunities exist in teaching, research, and extension work. Graduates in landscape architecture are prepared for advanced study in city or regional planning.

## Curriculum in
## LANDSCAPE ARCHITECTURE

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Elective** | | 3 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Military or Air Science** | (0-2) | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Landscape Architecture 201**<br>History of Landscape Design | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 16 | | | 16 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Floriculture 425**<br>Landscape Maintenance and Construction | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Landscape Architecture 304**<br>Landscape Construction | (2-3) | 3 | **Landscape Architecture 305**<br>Planting Design | (1-3) | 2 |
| **Landscape Architecture 320**<br>Landscape Design I | (0-12) | 4 | **Landscape Architecture 321**<br>Landscape Design II | (0-12) | 4 |
| **Elective** | | 2 | **Elective** | | 2 |
| | | 17 | | | 17 |

## SUMMER WORK

Landscape Architecture 300; Summer Practice, ten weeks, required.

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 305**<br>Graphic Art | (0-6) | 2 | **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 | **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Floriculture 319**<br>Exotic Plants | (2-2) | 3 | **Architecture 556**<br>City Planning | (2-3) | 3 |
| **Landscape Architecture 404**<br>Landscape Construction | (2-3) | 3 | **Landscape Architecture 421**<br>Landscape Design IV | (1-15) | 6 |
| **Landscape Architecture 420**<br>Landscape Design III | (1-15) | 6 | **Elective** | | 3 |
| | | 17 | | | 17 |

## Curricula in
## ENGINEERING

With the exception of geology, industrial distribution, industrial education, and industrial technology, all curricula in engineering are identical in the freshman year. Students who expect to enter engineering curricula and are not thoroughly grounded in the fundamentals of algebra and trigonometry are urged to attend a six-week term of summer school prior to the fall semester of the freshman year and take courses in algebra and trigonometry equivalent to Mathematics 102 and 103 at the A. and M. College of Texas. Those students who are not proficient in algebra and trigonometry and who are unable to attend summer school should omit Mathematics 121 and History 105 from their fall semester schedule and take Mathematics 102 and 103. Mathematics 121 should be taken in the spring semester and Mathematics 122 and History 105 in summer school after the freshman year. It is desirable for the student to resume the regular schedule as soon as possible.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 122**<br>Calculus | (4-0) | 4 |
| **Mathematics 121**<br>Analytic Geometry and Calculus | (4-0) | 4 | **Military or Air Science** | (0-2) | 1 |
| **Military or Air Science** | (0-2) | 1 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

## Curriculum in
## AERONAUTICAL ENGINEERING

Aeronautical engineering is described as the technical activities associated with the development of aircraft and missiles. These include research, analysis, and design in several technical specialties such as aerodynamics, dynamics of aircraft, structures, properties of materials and propulsion.

Aeronautical engineering graduates are employed in air-frame manufacturing companies, government research laboratories, and equipment manufacturing companies in Texas and elsewhere. A considerable number enter the military services as engineering officers. Aeronautical engineering graduates are also well qualified for positions in other fields of engineering, since men trained in aerodynamics and the design of high-strength, light-weight structures are in demand in many industries.

The Aeronautical Engineering Department has excellent facilities in the new Engineering Building on the campus and at the College-owned Easterwood Airport. Facilities on the campus include a supersonic wind tunnel, an instructional low-speed wind tunnel, a structures laboratory, a materials and process laboratory, and complete shop facilities. The Aeronautical Laboratories, including the large wind tunnel, are located at Easterwood Airport.

The four-year undergraduate curriculum in aeronautical engineering leading to the degree of Bachelor of Science includes sound preparation in mathematics, physics, chemistry, English, and mechanics. The junior and senior years are devoted largely to the professional courses in aerodynamics, aircraft structures, aircraft power plants, and aircraft design. The opportunity to elect courses in a desired specialty is provided in the senior year.

### For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Aeronautical Engineering 201**<br>Elementary Aerodynamics | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 301**<br>Theoretical Aerodynamics | (3-0) | 3 | **Aeronautical Engineering 302**<br>Experimental Aerodynamics | (1-3) | 2 |
| **Aeronautical Engineering 304**<br>Elementary Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 303**<br>High Speed Aerodynamics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Aeronautical Engineering 306**<br>Strength of Aircraft Materials | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| | | 16 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Aeronautical Engineering 405**<br>Aircraft Structures | (3-0) | 3 |
| **Aeronautical Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 |
| **Aeronautical Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 15 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Aeronautical Engineering 401**<br>Aircraft Design | (1-6) | 3 |
| **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 6 |
| **Elective (Humanities)** | | 3 |
| | | 16 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Aeronautical Engineering 201**<br>Elementary Aerodynamics | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Aeronautical Engineering 301**<br>Theoretical Aerodynamics | (3-0) | 3 |
| **Aeronautical Engineering 304**<br>Elementary Aircraft Structures | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Aeronautical Engineering 302**<br>Experimental Aerodynamics | (1-3) | 2 |
| **Aeronautical Engineering 303**<br>High Speed Aerodynamics | (3-0) | 3 |
| **Aeronautical Engineering 306**<br>Strength of Aircraft Materials | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 410**[1]<br>Internal Combustion Engines | (3-0) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Aeronautical Engineering 405**<br>Aircraft Structures | (3-0) | 3 |
| **Aeronautical Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Aeronautical Engineering 401**<br>Aircraft Design | (2-6) | 4 |
| **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **Aeronautical Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

NOTES:

1. Mechanical Engineering 410 may be replaced by any junior or senior level course in engineering, mathematics, or physics.
2. At least one of the technical electives in the senior year must be selected from Group A.

## Technical Electives for AERONAUTICAL ENGINEERING

| Group A | | |
|---|---|---|
| **Aeronautical Engineering 403**<br>Aerospace Materials Science | (3-0) | 3 |
| **Aeronautical Engineering 418**<br>Advanced Aerodynamics | (4-0) | 4 |
| **Aeronautical Engineering 421**<br>Dynamics of Airplanes | (3-0) | 3 |
| **Structural Mechanics 469**<br>Analysis of Structures | (2-3) | 3 |

| Group B | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 421**<br>Celestial Mechanics | (3-0) | 3 |

### Curriculum in

## AGRICULTURAL ENGINEERING

(See page 115 for a discussion of this curriculum.)

### Curriculum in

## CHEMICAL ENGINEERING

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a coordinated series of unit physical operations and unit chemical processes. The work of the chemical engineer is concerned primarily with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineering became a separate division of engineering with the growth of strictly chemical industries, and it is now recognized as one of the important divisions of engineering, dealing with combustion of fuels, heat treatment of metals and alloys, the preparation of water for potable and industrial use, the refining of petroleum, processing of vegetable oils, the development of electric furnace products, portland cement, lime gypsum, plaster, heavy chemicals, soaps, rubber, corn products, textiles, paper, artificial leather and silks, food products, and other products.

The work of the chemical engineer is the changing of raw materials into finished products with the greatest efficiency and economy. He substitutes a rigid control of processes for guess work and uncertainty and increases the productivity of labor by supplying more efficient processes where the standard and quality of the finished product are revised and the amount of seconds and rejections is reduced. The chemical engineer must also be able to modify a process in order to adapt it to commercial conditions and to select his material for construction with special reference to its use. His work is distinct from that of the chemist on the one hand and the mechanical engineer on the other, though he must have a thorough training in both chemistry and engineering.

The curriculum in chemical engineering is planned to prepare students for the design, construction, and operation of industries in which materials undergo chemical and physical change. The unit operations, such as fluid flow, heat flow, evaporation, drying, distillation, gas absorption, filtration, crushing and grinding, and size separation are basic studies that may be applied to any industry. General chemical processes are also included in the laboratory and classroom work. Research in both of these divisions is fostered by cooperative projects with the Texas Engineering Experiment Station and industrial organizations of the State.

As chemical engineering treats of the processes whereby materials undergo a chemical and physical change, it is apparent that a large number of diversified industries have use for the chemical engineer, not only in the operation and control of processes but in the design of special equipment. Many chemical engineers enter the research laboratory, investigating processes in the laboratory and supervising their operation in the plants, considering carefully the controlling interest of cost as a factor in all industrial operations.

**For classes entering in September 1962 and thereafter**

### FRESHMAN YEAR

(See page 182)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemical Engineering 204**<br>Elementary Chemical Engineering | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | (3-0) | 3 | **Chemical Engineering 314**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemical Engineering 423**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 | **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 | **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 | **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Chemical Engineering 441**<br>Chemical Engineering Unit Processes | (3-0) | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 | | | 17 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 | | | |
| **Elective (Humanities)** | | 3 | | | |
| | | 17 | | | |

### For classes graduating in 1962-63, 1963-64, and 1964-65

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemical Engineering 204**<br>Elementary Chemical Engineering | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 20 | | | 19 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemical Engineering 314**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemical Engineering 423**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemical Engineering 441**<br>Chemical Engineering Unit Processes | (3-0) | 3 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| | | 17 |

### Curriculum in

## CIVIL ENGINEERING

The curriculum in civil engineering has for its objective the thorough grounding of young men in the underlying principles of the basic sciences and engineering. Training or practice in the art of applying these principles to problems encountered in practice is given in the drafting room, laboratories, and in the field so as to enable the graduate to give satisfactory service in an engineering organization immediately upon graduation.

During the first three years the subject matter of the courses is common to all phases of civil engineering, such as surveying, highway engineering, mechanics, strength of materials, hydraulics, and stress analysis. In the fourth year, the student is given an opportunity to specialize moderately in structural engineering, highway engineering, hydraulic engineering, or municipal and sanitary engineering. In addition, courses in cost estimating and engineering economy are required of all the students to give them an understanding of the importance of these matters in the practice of civil engineering. Students who are interested in construction engineering should consider the possibility of obtaining a Bachelor of Science degree in Civil Engineering and a Bachelor of Business Administration degree. Copies of a degree plan to satisfy the requirements for both degrees may be obtained from the Civil Engineering Department.

The moderate specialization indicated above does not restrict the student to securing employment in a special field. The curriculum is so planned as to make it possible for him to undertake professional practice embracing the following: surveying; water supply; sewerage; the planning, design, and construction of buildings, bridges, earthen dams, reservoirs, canals, and the conventional types of foundations required for all of the structures; planning, design, construction, and maintenance of roads and highways; traffic engineering; planning and execution of sanitary measures for rural and urban communities; administration of city business as city manager; industrial, academic, and governmental research of civil engineering matters; and technical service of various kinds leading to executive positions in industry.

## For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 | **Physical Education 202** | (0-2) | R |
| | | | | | 17 |

### SUMMER WORK

Civil Engineering 300, Summer Surveying Practice, six weeks, credit 5

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 | **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 | **Civil Engineering 344**<br>Reinforced Concrete Structures | (3-3) | 4 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 | **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | 15 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 | **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 | **Civil Engineering 443**<br>Materials of Construction | (2-3) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 | **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 16 | | | 16 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 | **Physical Education 202** | (0-2) | R |
| | | | | | 17 |

## SUMMER WORK

Civil Engineering 300, Summer Surveying Practice, six weeks, credit 5

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| | | 15 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 344**<br>Reinforced Concrete Structures | (3-3) | 4 |
| **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 |
| **Civil Engineering 443**<br>Materials of Construction | (1-3) | 2 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

### Technical Electives for

### CIVIL ENGINEERING

| (Offered in Fall Semester only) | | |
|---|---|---|
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 |
| **Civil Engineering 435**<br>Soil Engineering | (2-3) | 3 |
| **Civil Engineering 457**<br>Traffic Engineering | (3-0) | 3 |
| **Civil Engineering 463**<br>Hydrology | (3-0) | 3 |
| **Geology 441**<br>Advanced Engineering Geology | (3-3) | 4 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Structural Mechanics 468**<br>Statically Indeterminate Structures | (2-3) | 3 |

| (Offered in Spring Semester only) | | |
|---|---|---|
| **Civil Engineering 403**<br>Sanitary Design | (2-3) | 3 |
| **Civil Engineering 417**<br>Bituminous Materials | (2-3) | 3 |
| **Civil Engineering 456**<br>Highway Design | (2-3) | 3 |
| **Civil Engineering 458**<br>Hydraulic Engineering | (3-0) | 3 |
| **Civil Engineering 470**<br>Aerial Photogrammetry | (2-3) | 3 |
| **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineering 486**<br>Design of Prestressed<br>Concrete Structures | (2-3) | 3 |
| **Structural Mechanics 469**<br>Analysis of Structures | (2-3) | 3 |

NOTE: By proper choice of technical electives, civil engineering students may specialize to some extent in highway, hydraulic, structural, construction, or sanitary engineering.

### Curriculum in

### ELECTRICAL ENGINEERING

The curriculum in electrical engineering is designed to give the student thorough training in the principles on which electrical phenomena are based. Instruction is provided in the basic sciences and mathematics that serve as the foundation for an engineering career.

The program for the first two years includes mathematics, physics, chemistry, and electrical science together with courses in English, history, economics, and other social and humanistic studies. The third year is devoted largely to the engineering sciences that are appropriate to all fields of electrical engineering. The program in the fourth year consists of studies of a professional nature illustrating the applications of engineering principles to typical problems in the fields of electronics, machinery, and communications. Elective courses in the fourth year permit the student to develop his interest in some particular field of electrical engineering.

Electrical engineering offers many opportunities to young men with suitable training. Graduates presently find employment in the aircraft and missile industry, public utilities, the petroleum industry, communications, and with electrical and electronic manufacturers. Electrical engineering education provides the necessary background for research, design and development, operations, management, and sales in the several industries in which electrical engineers work.

Students who expect to enroll in electrical engineering after attending another college should note that there is a six-semester sequence of electrical engineering courses in the curriculum. If the prerequisites are satisfied, transfer students may complete this sequence in two years and one summer session and should plan to transfer at the beginning of the summer session.

Student branches of the Institute of Radio Engineers and the American Institute of Electrical Engineers have been organized on the campus, and membership in one or both of these organizations serves to keep the student informed about current developments in the field of electrical engineering.

### For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Electrical Engineering 201**<br>Electricity and Magnetism | (3-4) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Electrical Engineering 214**<br>Electrical Circuit Theory | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

NOTE: Transfer students who have completed 68 acceptable credits of college work and lack no more than 14 credits of courses required in the sophomore year may attend both summer terms (12 weeks) and arrange a schedule to complete the degree program in four additional semesters. Such students should confer with the departmental advisor before enrolling in the summer session.

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **English 231**[1]<br>Survey of English Literature | (3-0) | 3 | **Electrical Engineering 330**<br>Electrical Machinery | (3-0) | 3 |
| **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 | **English 232**[1]<br>Survey of English Literature | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Electrical Engineering 439**<br>Electronic Systems | (3-0) | 3 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Technical Elective** | | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Elective**[3] | | 3 |
| **Technical Elective** | | 3 | | | |
| | | 17 | | | 17 |

## For classes graduating in 1963-64 and 1964-65

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Electrical Engineering 214**<br>Electrical Circuit Theory | (3-3) | 4 |
| **Electrical Engineering 201**<br>Electricity and Magnetism | (3-4) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## SUMMER SESSION

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (9-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (9-0) | 3 |
| | | 6 |

NOTE: Transfer students who have completed 68 acceptable credits of college work and lack no more than 14 credits of courses required in the sophomore year may attend both summer terms (12 weeks) and arrange a schedule to complete the degree program in four additional semesters. Such students should confer with the departmental advisor before enrolling in the summer session.

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **English 231**[1]<br>Survey of English Literature | (3-0) | 3 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Electrical Engineering 330**<br>Electrical Machinery | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **English 232**[1]<br>Survey of English Literature | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 439**<br>Electronic Systems | (3-0) | 3 | **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 | **Technical Elective** | | 3 |
| **Technical Elective** | | 3 | **Elective**[3] | | 3 |
| | | 15 | | | 16 |

### For class graduating in 1962-63

### SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 415**<br>Transmission Networks | (2-2) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Elective**[3] | | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 402**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

NOTES: 1. Any courses in English or American literature may be substituted for English 231 and 232.

2. Mathematics 405, 411, 414, 415, or 417 may be substituted for Mathematics 409.

3. Any junior or senior course from Group I, Humanities and Social Electives, page 216, may be chosen.

### Technical Electives for

## ELECTRICAL ENGINEERING

| Course | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 406**<br>Electric Power Distribution and Transmission | (2-2) | 3 |
| **Electrical Engineering 428**<br>Communication Circuits | (2-3) | 3 |
| **Electrical Engineering 441**<br>Symmetrical Components of Polyphase Circuits | (3-0) | 3 |
| **Electrical Engineering 451**<br>Applied Electromagnetic Theory | (3-0) | 3 |
| **Electrical Engineering 452**<br>Ultra High Frequency Techniques | (2-3) | 3 |
| **Electrical Engineering 454**<br>Advanced Electronic Circuits | (3-3) | 4 |
| **Electrical Engineering 456**<br>Communication Theory | (3-0) | 3 |
| **Electrical Engineering 457**<br>Principles of Electronic Computers | (3-3) | 4 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |

### Curriculum in

## GEOLOGICAL ENGINEERING

The curriculum in geological engineering provides training in the fundamental principles of engineering as well as specialized training in geology in a normal period of four years. Although this course is designed primarily for the student who expects to be employed as a petroleum geologist, the curriculum is such that the graduate is also qualified for work with railroads, public utilities, construction, ceramics, and other industries in which a knowledge of both geology and engineering is desirable.

Students interested in construction engineering and soil mechanics should consider obtaining a Bachelor of Science degree in Geological Engineeering and a Bachelor of Science degree in Civil Engineering. Copies of a degree plan to satisfy requirements for both degrees may be obtained from the Civil Engineering or the Geology Department.

In addition to the above degree programs, five-year combination degree curricula may be arranged, such as geological engineering—general business, geological engineering—petroleum engineering, or geological engineering—English for a student desiring a broader educational background.

## For classes entering in September 1962 and thereafter

## FRESHMAN YEAR

(See page 182)

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Petroleum Engineering 305***<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307***<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| First Semester | Th Pr | | Cr |
|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | | 3 |
| **English 231**<br>Survey of English Literature | (3-0) | | 3 |
| **Geology (one of the following)** | | | 3 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | | 3 |
| | | | 17 |

| Second Semester | Th Pr | | Cr |
|---|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | | 4 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology (two of the following)**** | | | 6 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 | |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Geology 433****<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Elective (Humanities)** | | | 3 |
| | | | 17 |

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*Civil Engineering 465 may be substituted for Petroleum Engineering 305 and 307.

**Geology 399, 6 hours, may be substituted for Geology 433, 2 hours; any one of Geology 304, 409, 423, or 425, 3 hours; and 1 hour elective.

## For classes graduating in 1962-63, 1963-64, and 1964-65

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 20 |

### SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 220**<br>Engineering Mechanics | (4-0) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 305****<br>Petroleum Development | (2-0) | 2 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 307****<br>Petroleum Development Laboratory | (0-3) | 1 | **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 | | | 17 |

### SUMMER CAMP

Geology 300, Field Geology, credit 6

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology (one of the following)** | | 3 | **Geology-Geophysics**<br>**(two of the following***)** | | 6 |
| **Geology 404**<br>Geology of Petroleum | (2-3) 3 | | **Geology 304**<br>Sedimentary Petrography | (2-3) 3 | |
| **Geology 406**<br>Economic Geology | (3-0) 3 | | **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) 3 | |
| **Geology 431**<br>Geomorphology | (2-3) 3 | | **Geology 423**<br>Micropaleontology | (1-6) 3 | |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 425**<br>Subsurface Geology | (2-3) 3 | |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 | **Geophysics 436**<br>Seismic Exploration | (2-3) 3 | |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 | **Geophysics 446**<br>Physics of the Earth | (3-0) 3 | |
| | | 17 | **Geology 433*****<br>Field Geology | (0-6) | 2 |
| | | | **Geology 482**<br>Seminar | (1-0) | 1 |
| | | | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

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*May be used as an elective.

**Civil Engineering 465 may be substituted for Petroleum Engineering 305 and 307.

***Geology 399, 6 hours, may be substituted for Geology 433, 2 hours; any one of Geology 304, 409, 423, or 425, 3 hours; and 1 hour elective.

## Curriculum in

## GEOLOGY

Training in geology is designed to prepare the student in the fundamentals of the earth sciences. These include the study of rocks, minerals, fossils, earth structures, the physical features of the earth's surface, and the economic application of this knowledge.

This curriculum is designed for the student who approaches geology as a science, with the inherent obligation of exploring, observing, analyzing, inquiring, classifying, describing, and finally interpreting the record and the content of the rocks. It is based upon the related sciences of chemistry, physics, mathematics, and biology. It prepares a man either for general geological investigations or for graduate study in geology in a normal period of four years.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0 2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 19 | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 17 |
| | | 19 | | | |

### SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 | **English 319**<br>Report Writing | (1-0) | 1 |
| **English 371**<br>Great Books | (3-0) | 3 | **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 423**<br>Micropaleontology | (1-6) | 3 |
| | | 16 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | | | | 17 |

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*May be used as an elective.

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| First Semester | Th Pr | | Cr |
|---|---|---|---|
| **Geology (three of the following)** | | | 9 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 437**<br>Cenozoic Micropaleontology | (1-6) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Elective** | | | 3 |
| | | | 17 |

| Second Semester | Th Pr | | Cr |
|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Geology-Geophysics (any two)**** | | | 6 |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Elective** | | | 3 |
| | | | 16 |

## Curriculum in GEOPHYSICS

### For classes entering in September 1962 and thereafter

## FRESHMAN YEAR

(Same as for engineering, page 182.)

## SOPHOMORE, JUNIOR, AND SENIOR YEARS

(A revised curriculum for these years will appear in the next issue of this catalogue.)

### For classes graduating in 1962-63, 1963-64, and 1964-65

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

## SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| | | 16 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| | | 16 |

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*May be used as an elective.

**Three credit hours of Geology 399 may be substituted for Geology 409, 423, or 425.

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Elective** | | 5 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **English 371**<br>Great Books | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

## Curriculum in
## INDUSTRIAL DISTRIBUTION

Industrial distribution prepares men for industrial technical sales. This program offers preparation in the methods of producing and distributing industrial products. It also provides an understanding of the personnel and human relations problems associated with the distribution of the products of our vast industrial and manufacturing system.

The program is oriented toward industrial and technical courses because the graduate will be selling industrial tools, equipment, and supplies to industrial centers and contractors. His relationships will be with executives, management, engineers, scientists, and craftsmen.

This is one of the few industrial distribution programs offered in the United States. Graduates of this four-year program receive the Bachelor of Science degree in Industrial Distribution.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-2) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

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*May be used as an elective.

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Mathematics 223**<br>Differential and Integral Calculus | **(4-0)** | **4** |
| **Mechanical Engineering 101**<br>Engineering Problems | **(0-3)** | **1** |
| **Mechanical Engineering 309**<br>Machine Production Techniques | **(0-3)** | **1** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 201**<br>College Physics | **(3-3)** | **4** |
| **Elective** | | **3** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **19** |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | **(1-3)** | **2** |
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Health Education 216**<br>First Aid | **(0-3)** | **1** |
| **Industrial Education 106**<br>Sheet Metal | **(1-5)** | **3** |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | **(3-0)** | **3** |
| **Mechanical Engineering 310**<br>Machine Production Techniques | **(0-3)** | **1** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 202**<br>College Physics | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **17** |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | **(2-3)** | **3** |
| **Business Administration 205**<br>Marketing | **(3-0)** | **3** |
| **Industrial Education 308**<br>A Study of Modern Industries | **(3-0)** | **3** |
| **Industrial Education 328**<br>Industrial Accident Prevention | **(3-0)** | **3** |
| **Journalism 321**<br>Industrial Journalism | **(2-2)** | **3** |
| **Elective** | | **4** |
| | | **19** |

| | | |
|---|---|---|
| **Business Administration 305**<br>Business Law | **(3-0)** | **3** |
| **Business Administration 318**<br>Wholesale Merchandising | **(3-0)** | **3** |
| **English 301**<br>Writing for Professional Men | **(3-0)** | **3** |
| **Industrial Education 304**<br>Applied Industrial Electricity | **(2-3)** | **3** |
| **Industrial Education 326**<br>General Metalwork | **(1-5)** | **3** |
| **Industrial Engineering 302**<br>Production Engineering | **(1-2)** | **2** |
| **Elective** | | **1** |
| | | **18** |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 435**<br>Salesmanship | **(3-0)** | **3** |
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Industrial Education 429**<br>Foremanship and Supervision | **(3-0)** | **3** |
| **Industrial Education 447**<br>Electricity and Electronics | **(2-3)** | **3** |
| **Psychology 401**<br>Industrial Psychology | **(3-0)** | **3** |
| **Elective** | | **4** |
| | | **18** |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | **(3-0)** | **3** |
| **Business Administration 446**<br>Marketing Industrial Products | **(2-0)** | **2** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Industrial Education 481**<br>Seminar in Industrial Education | **(1-0)** | **1** |
| **Industrial Engineering 412**<br>Labor and Industry | **(3-0)** | **3** |
| **Elective** | | **6** |
| | | **18** |

## ELECTIVES FOR INDUSTRIAL DISTRIBUTION

Electives for industrial distribution, industrial education, and industrial technology are to be selected from the general engineering electives shown on page 216 or from the following:

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | **(3-3)** | **4** |
| **Civil Engineering 201**<br>Plane Surveying | **(3-3)** | **4** |
| **Civil Engineering 206**<br>Plane Surveying | **(0-3)** | **1** |
| **Civil Engineering 208**<br>Topographic Surveying | **(1-3)** | **2** |
| **Civil Engineering 300**<br>Summer Surveying Practice | | **5** |
| **Education 426**<br>Tests and Measurements | **(3-0)** | **3** |
| **Geology 205**<br>Elementary Geology | **(3-3)** | **4** |
| **Industrial Education 427**<br>Driver Education | **(1-6)** | **3** |
| **Journalism 205**<br>Principles of Typography | **(2-3)** | **3** |
| **Journalism 315**<br>Photography | **(1-3)** | **2** |
| **Mathematics 104**<br>Analytic Geometry | **(3-0)** | **3** |

| | | |
|---|---|---|
| **Mathematics 121**<br>Analytic Geometry and Calculus | **(4-0)** | **4** |
| **Mathematics 209**<br>Calculus | **(3-0)** | **3** |
| **Mechanical Engineering 212**<br>Engineering Mechanics | **(3-0)** | **3** |
| **Physical Education 221**<br>Safety Education | **(2-0)** | **2** |
| **Psychology 207**<br>General Psychology | **(3-0)** | **3** |
| **Psychology 305**<br>Personality Adjustments | **(3-0)** | **3** |
| **Psychology 323**<br>Psychology of Adolescence | **(3-0)** | **3** |
| **Sociology 304**<br>Criminology and Juvenile Delinquency | **(3-0)** | **3** |
| **Sociology 408**<br>Organization for Boy Scout Work | **(2-0)** | **2** |

## Curriculum in
## INDUSTRIAL EDUCATION

### Industrial Arts Teacher Education Option

This curriculum prepares men to teach Industrial Arts in the junior and senior high schools, technical schools, and colleges.

Industrial arts includes such content areas as general shop, woodwork, metals, drafting, electricity, plastics, ceramics, leather, and other craft courses. The program of industrial arts teacher education provides excellent technical and professional background in the most modern laboratories and classrooms.

Students completing this four-year program receive the Bachelor of Science degree in Industrial Education and are qualified to apply for the appropriate teaching certificate from the Texas Education Agency.

Teacher education students may also qualify for a certificate to teach driver education in junior and senior high schools and in colleges and private agencies by taking six semester hours of specified and approved courses under a program approved by the American Automobile Association and the Texas Education Agency.

### FRESHMAN YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Engineering Graphics 105**<br>Engineering Drawing | **(0-6)** | **2** |
| **English 103**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **History 105**<br>History of the United States | **(3-0)** | **3** |
| **Industrial Education 105**<br>Wood Craft | **(1-5)** | **3** |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | **(2-3)** | **3** |
| **Mathematics 102**<br>Algebra | **(3-0)** | **3** |
| **Mechanical Engineering 201**<br>Manufacturing Processes | **(0-3)** | **1** |
| **Military or Air Science** | **(0-2)** | **1** |
| **Physical Education 101** | **(0-2)** | **R** |
| | | **19** |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | **(3-3)** | **4** |
| **Engineering Graphics 106**<br>Descriptive Geometry | **(0-6)** | **2** |
| **Engineering Graphics 128**<br>Methods of Industrial Reproduction | **(0-2)** | **1** |
| **English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **History 106**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 103**<br>Plane Trigonometry | **(3-0)** | **3** |
| **Mechanical Engineering 202**<br>Manufacturing Processes | **(0-3)** | **1** |
| **Military or Air Science** | **(0-2)** | **1** |
| **Physical Education 102** | **(0-2)** | **R** |
| | | **18** |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Industrial Education 205**<br>Ornamental Iron | **(1-5)** | **3** |
| **Mechanical Engineering 101**<br>Engineering Problems | **(0-3)** | **1** |
| **Mechanical Engineering 309**<br>Machine Production Techniques | **(0-3)** | **1** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 201**<br>College Physics | **(3-3)** | **4** |
| **Elective** | | **2** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **17** |

| | | |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | **(1-3)** | **2** |
| **Engineering Graphics 221**<br>Building Construction Drawing | **(1-3)** | **2** |
| **Industrial Education 106**<br>Sheet Metal | **(1-5)** | **3** |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | **(3-0)** | **3** |
| **Mechanical Engineering 106**<br>Cabinet Making | **(1-6)** | **3** |
| **Mechanical Engineering 310**<br>Machine Production Techniques | **(0-3)** | **1** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 202**<br>College Physics | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **19** |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Industrial Education 323**<br>Methods of Teaching<br>Mechanical Drawing | (1-3) | 2 |
| **Industrial Education 327**<br>Industrial Arts Handcraft | (1-5) | 3 |
| **Industrial Education 334**<br>Upholstery | (1-3) | 2 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 310**<br>Course Making | (2-0) | 2 |
| **Industrial Education 332**<br>Plastics and Ceramics | (1-3) | 2 |
| **Industrial Education 336**<br>Design in the Arts and Crafts | (1-3) | 2 |
| **Mechanical Engineering 329**<br>Advanced Cabinet Making | (1-6) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 301**<br>Methods of Teaching and<br>Class Management | (3-0) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Education 404**<br>Visual Aids for<br>Industrial Subjects | (1-2) | 2 |
| **Industrial Education 406**<br>Industrial Guidance | (2-0) | 2 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 |
| **Industrial Education 419**<br>Laboratory of Industries Methods | (1-3) | 2 |
| **Industrial Education 442**<br>Supervised Teaching<br>in Industrial Arts | (2-12) | 6 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Elective** | | 5 |
| | | 17 |

### Vocational Industrial Teacher Education Option

This program is designed for teachers, supervisors, directors, and consultants of vocational educational schools and classes of Texas. Students satisfying the requirements under this program may qualify as teachers under the State Plan for Vocational Education as specified by the Texas Education Agency.

The applicant for this program must have had at least one full year of employed experience at some skilled trade or industrial technical occupation. The student who desires to graduate under this program must submit a written request accompanied by a statement of his employed practical experience. Upon the approval of the request by the Head of the Department and the Dean of Engineering, the student will be permitted to plan a program within the limit of the courses listed here.

Approved industrial experience may be evaluated in terms of college credits and, if acceptable to the Head of the Department and to the Dean of the School of Engineering, may be used in the place of shop work on the basis of four credit hours for each year of industrial experience up to a maximum of twenty credits. Approved teaching experience may be credited as supervised teaching on the basis of two credit hours per year up to a maximum of six credits.

Graduates of this program will receive the Bachelor of Science degree in Industrial Education and may qualify for the appropriate teaching certificate as approved by the Texas Education Agency.

## REQUIRED COURSES

| GENERAL EDUCATION | | | Minimum Credits |
|---|---|---|---|
| **Economics** | | | 6 |
| Economics 203<br>Principles of Economics | (3-0) | 3 | |
| Economics (elective) | | 3 | |
| **English** | | | 10 |
| English 103<br>Composition and Rhetoric | (3-0) | 3 | |
| English 104<br>Composition and Rhetoric | (3-0) | 3 | |
| English 203<br>Introduction to Literature | (2-0) | 2 | |
| English 210<br>Introduction to Logical Discourse | (2-0) | 2 | |
| **Government** | | | 6 |
| Government 306<br>American National Government | (3-0) | 3 | |
| Government 307<br>State and Local Government | (3-0) | 3 | |
| **History** | | | 6 |
| History 105<br>History of the United States | (3-0) | 3 | |
| History 106<br>History of the United States | (3-0) | 3 | |
| **Mathematics** | | | 6 |
| Mathematics 102<br>Algebra | (3-0) | 3 | |
| Mathematics 103<br>Plane Trigonometry | (3-0) | 3 | |
| **Public Speaking** | | | 1 |
| English 401<br>Public Speaking | (0-2) | 1 | |
| **Sociology** | | | 3 |
| Sociology (elective)<br>(Sociology 315 not acceptable) | | 3 | |
| TECHNICAL | | | |
| **Engineering Drawing** | | | 4 |
| Engineering Graphics 105<br>Engineering Drawing | (0-6) | 2 | |
| Engineering Graphics 106<br>Descriptive Geometry | (0-6) | 2 | |
| **Engineering Problems** | | | 1 |
| Mechanical Engineering 101<br>Engineering Problems | (0-3) | 1 | |
| **Shop Work** | | | 24 |
| Includes credit for industrial work experience | | | |
| SCIENCE | | | |
| **Chemistry** | | | 4 |
| Chemistry 106<br>General Chemistry | (3-3) | 4 | |
| **Industrial Supervision or Management** | | | 3 |
| Industrial Education 429<br>Foremanship and Supervision | (3-0) | 3 | |
| Or | | | |
| Industrial Engineering 401<br>Survey of Industrial Engineering | (3-0) | 3 | |
| **Modern Industries** | | | 3 |
| Industrial Education 308<br>A Study of Modern Industries | (3-0) | 3 | |

| | | | |
|---|---|---|---|
| **Physics** | | | 8 |
| Physics 201<br>College Physics | (3-3) | 4 | |
| Physics 202<br>College Physics | (3-3) | 4 | |

### MILITARY TRAINING

| | |
|---|---|
| **Military or Air Science** | 4 |

### PROFESSIONAL EDUCATION

The courses listed below are the basic ones required by the Vocational Division of the Texas Education Agency for a vocational certificate.

| | | | |
|---|---|---|---|
| **General Requirements** | | | 9 |
| Industrial Education 204<br>Development and Practice in Industrial Education | (3-0) | 3 | |
| Industrial Education 301<br>Methods of Teaching and Class Management | (2-0) | 2 | |
| Industrial Education 310<br>Course Making | (2-0) | 2 | |
| Industrial Education 424<br>Organization of Instructional Material. | (1-2) | 2 | |

Additional courses and related fields are listed below depending upon the certificate desired.

| | | |
|---|---|---|
| **For Vocational Industrial Shop Teachers** | 6 | |
| Visual Aids for Industrial Subjects | | |
| Methods of Introducing Industrial Organization and Management into Industrial Schools | | |
| Or | | 6 |
| **For Part-Time Cooperative Training Coordinators** | 6 | |
| Follow-up, Visitation, and Coordination in Part-Time Schools | | |
| Related subjects in part-time cooperative programs | | |
| **Supervised Teaching** | | 6 |
| **Other general education courses suited to the needs of the student** | | 8 |

### ELECTIVE

| | |
|---|---|
| **To be approved by the Head of the Department** | 27 |
| **TOTAL CREDITS** | 145 |

## ELECTIVES

(Same as for Industrial Distribution, see page 198.)

## Curriculum in
## INDUSTRIAL ENGINEERING

Industrial engineering is the science of production. Just as the other branches of engineering use the laws of the physical sciences in the design and operation of a product, so does industrial engineering apply these same laws to the design, selection, and operation of the plant in which this product is produced. A major distinction between industrial engineering and other branches is that the industrial engineer must consider not only the behavior of inanimate objects as they are governed by physical laws, but also must include in his plan the behavior of people as they operate together in organizations, whether these organizations be simple or complex.

Although usually the industrial engineer is concerned with the production of a manufactured article, the same principles of scientific analysis, planning, and control which are effective in this field have been found to be quite useful in any activity where a large number of people work together. Thus, industrial engineers find employment in wholesale trade, in transportation, even in banks and insurance companies. Because of the increasing technical complexity of today's manufacturing operations, there is a rapidly increasing demand the graduate woh plans to make his career that of production control and supervision.

### Four-Year Curriculum

The four-year curriculum leading to the Bachelor of Science degree in industrial engineering fills the above need by providing training in the basic engineering subjects of mathematics, physics, drawing, chemistry, and mechanics which are common to most engineering curricula. Beyond this, it gives students training in manufacturing processes, setting time standards, production control, quality control, tool engineering, cost analysis, factory design, industrial relations, and operations research. This combination well equips the graduate who plans to make his career that of production control and supervision.

### Five-Year Curriculum

Since there is an insistent and growing demand for men versed in the fundamentals of other branches of engineering and also in the fundamentals of executive control, there are offered five-year curricula designed for students who wish training in industrial and in aeronautical, chemical, civil, electrical, mechanical, or petroleum engineering. Thus, in five years the student may complete the requirements for two Bachelor of Science degrees, one in his preferred specialty of engineering and the other in the field of industrial engineering. The completion of the requirements for these two degrees should admirably prepare the engineering graduate for rapid advancement.

Students desiring to work toward the two degrees should consult with the Director of Admissions and Registrar or the Head of the Industrial Engineering Department for the course requirements. The industrial engineering courses may be taken either concurrently with courses in any of the above branches, which will enable the students to get both degrees at the same time, or may be taken after the first degree is granted. Ordinarily two semesters of additional work are sufficient to complete the requirements for the second degree in industrial engineering.

## For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics (elective*)** | | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

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*To be selected from Mathematics 308, 414, or 417.

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
|  |  |  | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
|  |  | 17 |  |  | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 | **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 453**<br>Tool Engineering | (2-3) | 3 | **Industrial Engineering 485**<br>Special Problems in Industrial Engineering |  | 2 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 | **Technical Elective** |  | 3 |
| **Technical Elective** |  | 2 | **Elective (Humanities)** |  | 3 |
|  |  | 17 |  |  | 17 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

## SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Industrial Engineering 202**<br>Introduction to Industrial Engineering | (2-0) | 2 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
|  |  | 19 |  |  | 19 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
|  |  |  | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
|  |  | 17 |  |  | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 |
| **Industrial Engineering 453**<br>Tool Engineering | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Technical Elective** | | 2 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | |
| **Or** | | 3 or 4 |
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 16 or 17 |

## Technical Electives for
## INDUSTRIAL ENGINEERING

The student should observe that these electives may be used for obtaining a better background in statistics, accounting, or economics. Some technical subjects are available for those so inclined.

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 |
| **Business Administration 337**<br>Data Processing | (2-2) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |
| **Business Administration 463**<br>Employee Supervision | (2-0) | 2 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **Economics 437**<br>Government and Labor Relations | (2-0) | 2 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | 4 |
| **Electrical Engineering 420**<br>Servomechanisms and<br>Control Devices | (3-0) | 3 |
| **Engineering Graphics 209**<br>Nomography | (2-0) | 2 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Industrial Engineering 410**<br>Current Practices in<br>Industrial Engineering | | 3 |
| **Industrial Engineering 411**<br>Wage and Salary Control | (3-0) | 3 |
| **Industrial Engineering 485**<br>Special Problems in<br>Industrial Engineering | | 1 to 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Journalism 406**<br>Publicity and Public Relations | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mathematics 411**<br>Mathematical Probability | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| ***Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning<br>and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |

## Curriculum in
## INDUSTRIAL TECHNOLOGY

Industrial technology prepares men for industrial positions in industrial relations, safety (industrial accident prevention), supervision, production, and employee training. Careers in safety are generally available with casualty insurance companies as well as with many of the larger industries. Among the positions in safety are inspectors, specialists, coordinators, directors, and industrial accident prevention consultants.

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*May be used for Mechanical Engineering 337 and 2 hours of technical elective.

The industrial technologist assists with technical details; uses tools and instruments; fabricates, operates and maintains; tests and performs scientific and technical operations; and reports on and carries out prescribed action. Interests and abilities determine the direction of specialization within this field. The graduate is awarded the Bachelor of Science degree in Industrial Technology.

## FRESHMAN AND SOPHOMORE YEARS

(Same as for Industrial Distribution, see page 197.)

## JUNIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | (2-3) | 3 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Industrial Education 308**<br>A Study of Modern Industries | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 | **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 | **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Elective** | | 7 | **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| | | 19 | **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| | | | **Elective** | | 1 |
| | | | | | 18 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Industrial Education 423**<br>Analysis Procedure | (1-2) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Industrial Education 429**<br>Foremanship and Supervision | (3-0) | 3 | **Industrial Education 438**<br>Industrial Safety | (2-3) | 3 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 | **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Elective** | | 5 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| | | 18 | **Elective** | | 2 |
| | | | | | 18 |

## ELECTIVES

(Same as for Industrial Distribution, see page 198.)

## Curriculum in

## MECHANICAL ENGINEERING

The breadth of the field of mechanical engineering is such that extensive specialization in undergraduate work is impossible and undesirable. Industry needs mechanical engineers for such a variety of work that it is deemed wise to make the curriculum broad and fundamental.

Training in habits of accurate analysis and logical thinking, the prerequisites of a good engineer, is emphasized.

Fundamental theory courses are supplemented by laboratory work in pattern making, foundry, machining, welding, and experimentation. Laboratory courses are designed to instruct in methods rather than to develop extensive skills.

Some specialization is possible in that during the senior year the student may elect courses in such fields as air conditioning, automotive engineering, internal combustion engines, turbines, marine engineering, and data processing.

The work of professional mechanical engineers varies from general engineering to highly specialized fields. It logically falls under **design, construction and erection, operation and maintenance, research, administration,** and **sales.**

**Design engineers** may find their work to be that of original design of machines and associated equipment; design of operating assemblies of machines and equipment commercially available for desired manufacturing, or process jobs; redesign of existing equipment to make possible changes, to improve economy, safety, and appearance.

**Construction and erection engineers** may be responsible for assembling and fabricating entire plants and putting them into operation. They must be able to use engineering drawings, plans and specifications, and to do supplementary design work.

**Operation and maintenance engineers** are in charge of plant performance and upkeep. They must be capable of securing profitable operation and of the supervision of plant personnel.

**Research engineers** are called on for an endless variety of investigations. They must have inquiring minds, initiative, patience, thorough knowledge of the fields in which they work, and the ability to analyze and correlate the results obtained. For the research man, graduate study is recommended.

Many engineers who have the leadership ability, personality, tact, and initiative become **administrators** and **executives.**

**Sales engineers** are probably as much in demand as any other group.

Among the industries that employ a large number of mechanical engineers are: air conditioning, aircraft, automotive, chemical, power, petroleum, refrigeration, and general manufacturing.

### For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 16 | | | 17 |

## SENIOR YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 | **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 | **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 | **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 | **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 | **Technical Elective** | | 3 |
| **Technical Elective** | | 3 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 18 |
| | | 19 | | | |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 | **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 | **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 | **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 | **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 | **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 17 | | | 17 |

## Technical Electives for
## MECHANICAL ENGINEERING

| | | |
|---|---|---|
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Mechanical Engineering 409**<br>Structure and Properties of Alloys | (2-3) | 3 |
| **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| **Mechanical Engineering 414**<br>Steam and Gas Turbines | (3-0) | 3 |
| **Mechanical Engineering 420**<br>Marine Engineering | (3-0) | 3 |
| **Mechanical Engineering 432**<br>Automotive Engineering | (3-0) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Mechanical Engineering 485**<br>Advanced Problems in Mechanical Engineering | | 2 to 5 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |

## Curricula in
## PETROLEUM ENGINEERING

The curricula in petroleum engineering are intended to prepare students for the petroleum industry and particularly for those branches which have to do with drilling, production, and transportation of petroleum as well as with the natural gas industry.

Four courses in petroleum engineering are available to the students in this department: (1) a regular four-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Science; (2) a five-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Petroleum Engineering; (3) a five-year curriculum in petroleum engineering—geological engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Geological Engineering; (4) a five-year curriculum in petroleum engineering—mechanical engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering.

In addition to these specific degree programs, five-year combination degree curricula may be arranged, such as petroleum engineering—general business, petroleum engineering—chemical engineering, petroleum engineering—industrial engineering, or petroleum engineering—English for one desiring a broader educational background. Those desiring the five-year combination degree curricula in petroleum engineering and another field should contact the Head of the Petroleum Engineering Department for assistance in planning the course of study.

### Four-Year Curriculum

(A minimum of six weeks of approved experience in oil field operations or
Petroleum Engineering 300 required for registration in senior
Petroleum Engineering courses)

The four-year curriculum in petroleum engineering includes sufficient training in civil, mechanical, and electrical engineering to prepare the graduate for the application of engineering principles to the petroleum industry. Courses in geology give an understanding of the geological structures and conditions favorable for petroleum deposits. To the basic subjects are added courses in petroleum engineering which illustrate the application of engineering principles to the type of problems met in the petroleum industry and which also give some understanding of the technique of the industry. Emphasis is placed on thorough grounding in the fundamental rather than on application to particular problems.

## For classes entering in September 1962 and thereafter

### FRESHMAN YEAR

(See page 182)

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 6 |
| | | 17 |

## For classes graduating in 1962-63, 1963-64, and 1964-65

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **History 315**<br>The United States,<br>1901 to the Present | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 6 |
| | | 17 |

## Five-Year Curriculum

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

The five-year curriculum in petroleum engineering is designed to provide a broader educational background. This curriculum contains all the courses included in the four-year curriculum and courses in psychology, accounting, English, economics, business, geography, and advanced mathematics.

## FRESHMAN YEAR

(See page 182)

## SOPHOMORE, JUNIOR, SENIOR, AND FIFTH YEARS

(A revised curriculum for these years will appear in the next issue of this catalogue.)

## For classes graduating in 1962-63, 1963-64, 1964-65, and 1965-66

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Analysis | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-3) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 320**<br>Selected Reading | (1-0) | 1 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective (Humanities)** | | 4 |
| | | 17 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

### Five-Year Curriculum in

## PETROLEUM ENGINEERING—GEOLOGICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

The five-year petroleum engineering—geological engineering course includes all of the subjects given in the four-year petroleum engineering course and all of the subjects in the four-year geological engineering course. This combination five-year course is intended to give a student interested in geology a background in engineering and the application of geology and engineering to the petroleum industry.

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*To be chosen from Petroleum Engineering 416 or 419.

## FRESHMAN YEAR

(See page 182)

## SOPHOMORE, JUNIOR, SENIOR, AND FIFTH YEARS

(A revised curriculum for these years will appear in the next issue of this catalogue.)

**For classes graduating in 1962-63, 1963-64, 1964-65, and 1965-66**

### SOPHOMORE YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

### SUMMER CAMP

(Optional)

Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

### SUMMER CAMP

Geology 300, Field Geology, credit 6

### SENIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology or Geophysics Elective*** | | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 18 |

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*To be selected from: Geology 304, 409, 423, 443; Geophysics 436, 446.

## FIFTH YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geology or Geophysics Elective*** | | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| | | 16 |

### Five-Year Curriculum in

## PETROLEUM ENGINEERING—MECHANICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

The five-year curriculum in petroleum engineering—mechanical engineering leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering. The scope of the work in the petroleum industry is so broad and so varied that it is desirable for the man who expects to enter this field to have a very comprehensive training. This course is designed to give such breadth of training by including the essential courses in both the petroleum and mechanical curricula. The production, transportation, and refining of oil involve the generation and utilization of power, the design and operation of mechanical equipment, the principles of heat transfer, and the handling of men and finances. Thus, a five-year curriculum combining the two courses was deemed desirable.

## FRESHMAN YEAR

(See page 182)

## SOPHOMORE, JUNIOR, SENIOR, AND FIFTH YEARS

(A revised curriculum for these years will appear in the next issue of this catalogue.)

### For classes graduating in 1962-63, 1963-64, 1964-65, and 1965-66

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

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*To be selected from: Geology 304, 409, 423, 443; Geophysics 436, 446.

## SUMMER SESSION

| First Term | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (9-0) | 3 |
| **History 106**<br>History of the United States | (9-0) | 3 |
| | | 6 |

| Second Term | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (9-0) | 3 |
| **Government 306**<br>American National Government | (9-0) | 3 |
| | | 6 |

## JUNIOR YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 482**<br>Seminar | (0-2) | 1 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (3-0) | 3 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 18 |

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*From Mechanical Engineering Approved List.

## Electives in

## ENGINEERING*

Students with the proper prerequisites may choose their general electives from the list below. Other courses are available to the student upon recommendation of department heads and the approval of the Dean of Engineering.

### I. Humanities—Social Science

1. Architecture 339, 340, 439, 440; English 212, 231, 232, 315, 316, 321, 322, 327, 328, 334, 336, 340, 350, 371, 375; Geography 204, 312, 401; Liberal Arts 201, 301, 304; Psychology 207, 301, 303, 305, 401, 403; Sociology 205, 206, 311, 314, 315, 320, 412, 418.
2. Economics: Any course offered by the Department.
3. History and Government: Any sophomore, junior, or senior course offered by the Department.
4. Modern Languages: Any course offered by the Department.
5. Religious Education: Any course, but not more than 4 semester hours may be counted.

### II. Others

1. Civil Engineering 406, 408, 435, 448, 457, 473; Electrical Engineering 331, 457; Engineering Graphics 221; English 301, 309; Geology 201 or 205; Health Education 216; Industrial Education 328, 429; Industrial Engineering 401, 411, 412, 414, 458; Journalism 304, 311, 315, 321, 406; Oceanography 401; Physical Education 210, 221.
2. Air Science: Any junior or senior course offered by the Department.
3. Biology: Any course, but not more than 7 hours of freshman courses.
4. Business Administration: Any sophomore, junior, or senior course offered by the Division.
5. Chemistry: Any sophomore, junior, or senior course offered by the Department.
6. Mathematics: Any junior or senior course offered by the Department.
7. Military Science: Any junior or senior course offered by the Department.
8. Nuclear Engineering: Any course offered by the Department.
9. Physics: Any junior or senior course offered by the Department.

*Certain courses from the above list are acceptable to the Air Science and the Military Science Departments in partial fulfillment of the ROTC requirements.

# THE SCHOOL OF MILITARY SCIENCES

The participation of our government in foreign affairs makes it apparent that every young American must recognize his obligation for service to his country and should realize the necessity for coordination of his military and civilian careers. The Army and Air Force at the Agricultural and Mechanical College of Texas offer ROTC courses which supplement the student's civilian curriculum and offer him the opportunity of planning his civilian and military careers on a mutually supporting basis.

In the words of General Eisenhower, "ROTC is a ready-made course, designed and perfected to develop the qualities of leadership required in both military and civil enterprise."

## AIR SCIENCE

The Air Force ROTC program is designed to develop qualities of leadership, character, and citizenship, and to prepare selected college students to be commissioned officers in the United States Air Force. The first Air Force (then Air Service) ROTC units were established in 1920 at the Universities of California and Illinois, at Massachusetts Institute of Technology, and at the Agricultural and Mechanical College of Texas. Today the program includes over 100,000 students at approximately 175 colleges and universities.

The Air Force ROTC program, called Air Science, is divided into two parts. The first two years constitute the basic course and the second two years constitute the advanced course. Successful completion of the advanced course is a prerequisite for commissioning. The basic course acquaints students with the aerospace power concept as well as prepares them for the advanced course. However, since not all cadets qualify for entry into the advanced course, the emphasis in the basic course is on aerospace age citizenship and is intended to help all young men face the challenges of the aerospace age. Cadets enrolled in the basic course are deferred from draft by Selective Service. Enrollment in the basic course is limited to students who are citizens of the United States, not less than 14 years of age, physically qualified for military service, loyal to the United States, and of good moral character. Upon request, the Professor of Air Science may permit a student who does not meet these criteria to pursue the course for academic credit only or to satisfy the College requirement for military training, but the student must purchase the required uniform at his own expense.

Cadets in the first year of the basic course attend class one hour a week and participate in leadership laboratory one hour a week. The first-year curriculum is designed to acquaint the cadet with the foundations of aerospace power; the fundamentals of aerospace science; and the mission, organization, and operation of the USAF. Cadets in the second year of the basic course attend class two hours a week and leadership laboratory one hour a week. The second year consists of a survey of the development of aerospace warfare with emphasis on the principles of war, concepts of employment of aerospace forces, weapon systems development, and the problems and possibilities of operating in space. Professional opportunities in the USAF are also covered.

Leadership training is continuous during the student's life as an Air Force ROTC cadet. Classroom instruction and the leadership laboratory are both designed to develop to the maximum each cadet's leadership potential and his knowledge of military fundamentals. Instruction in military courtesy and discipline will be of value in any walk of life. The common courtesies, respect for authority, and intelligent leadership demanded by the Air Force are the same qualities needed for success in civilian life. In this program the cadet has an opportunity to apply principles of leadership, management, and staff work in actual situations.

Cadets apply for enrollment in the advanced course during their second year of basic air science. They take the Air Force Officer Qualification Test and those who qualify are given a physical examination. Enrollment in the advanced course is carefully limited to students of high moral character who are physically qualified, who possess the necessary interest, intelligence, and aptitude, who have demonstrated leadership potential, and who are well qualified academically. For enrollment in the advanced course, the cadet must have proven himself diligent and successful in his regular studies and not just in his air science courses. Academic excellence is strongly encouraged. The purpose of this program is to supplement the student's regular academic work with a program of education and training that will prepare him to accept and discharge the responsibilities of leadership that are inherent in commissioned officer positions. Graduation and a degree are prerequisites to a commission but the bare minimum is not acceptable. An advanced course cadet is a member of a select group.

The first year of the advanced course is a study of the principles of leadership and management as they apply to Air Force problems and tasks. Included are Air Force leadership doctrine, major socio-psychological principles of leadership, a consideration of the leader-follower relationship in an Air Force environment, and communication theory relevant to leadership. During the summer between the first and second years of the advanced course, the cadet attends a four-week summer camp on an Air Force base. Here during a period of intense training under close supervision, he sees the Air Force in operation and becomes familiar with its equipment, procedures, and systems. The second year of the advanced course is a study of global relationship of special concern to the Air Force officer with attention to such aspects as weather, navigation, world political geography, and international relations. With the approval of the Air Force and the College, certain college courses have been substituted for Air Science courses with similar objectives. These courses are: English 210, Introduction to Logical Discourse; English 401 (or 403), Public Speaking; History 318, International Developments since 1918; and Geography 401, International Political Geography. As a result, the advanced course Air Force ROTC student now has more time available to further his study in his academic major.

During his senior year, a cadet who has applied for Air Force pilot training after graduation is given 36½ hours of flight training in light aircraft and 36½ hours of ground school. Flight training is provided at the College by an FAA approved flying school operator, and upon successful completion, the student is eligible for a private pilot's license.

If a student is selected for enrollment in the advanced course, he must agree to complete the advanced course, complete the Summer Training Unit during the summer between his junior and senior years, and, upon graduation, accept a commission as an officer in the Air Force Reserve if one is tendered. The foregoing becomes an integral part of his degree requirements from the College. He must also agree to serve on active duty for not less than four years after being commissioned, or, if applying for flight training either as a pilot or as a navigator, must agree to serve on active duty for not less than four years after completion of basic flight training. Advanced course cadets are deferred from draft by Selective Service. They receive approximately $500.00 from the Air Force during their two years in the program. This is in addition to their pay and travel allowances received in connection with their attendance at the Summer Training Unit.

Upon completion of the advanced course and graduation from College, students are commissioned as second lieutenants in the United States Air Force Reserve. Distinguished graduates are eligible to receive commissions in the Regular Air Force.

The Air Force ROTC program is administered by the Department of Air Science, which is an integral part of the College. All instructors are active duty officers assigned to the College by the United States Air Force. Details on courses offered are set forth under the departmental listing in this catalogue. Information desired may be obtained by writing directly to the Professor of Air Science.

## MILITARY SCIENCE

While the four-year ROTC course normally leads to a reserve commission, the Army relies upon this source for half of the new Regular Army Officers appointed each year. The Army program is a general military science curriculum, and under the Distinguished Military Graduate program, interested cadets can apply for and be granted regular commissions upon graduation. Those students selected must be outstanding in military aptitude and academic proficiency. They will be tendered the same type of commission given graduates of the United States Military Academy, West Point, New York. Many A. and M. graduates who received their commissions under this program are now actively pursuing Army careers.

Branch assignments for regular and reserve commissions will be made by the Department of the Army. These branch assignments will be based on the curriculum of the student's major field of study, student preference, leadership, and technical qualifications. Students will select three branches in order of preference. If a student is physically qualified for a commission in the combat branches, one of the three branches selected must be a combat arm.

## THE ARMY COMBAT ARMS

The mission of the entire Army is to support the fighting teams on the battle lines—the men who get there first. These teams are made up of Infantry, Armor, Artillery, Engineers, and Signal Corps.

INFANTRY. Post World War II hostilities have illustrated again that the Infantry officer is the key to success in battle. He is the bulwark of Americanism whose steadfastness is the true measure of our national security.

As the lives of our fighting men are more highly valued than the equipment of war, competent leadership is imperative. To meet this need, the U. S. Infantry officer has developed throughout our history to his present status of personnel management specialist in addition to his tactical proficiency. He undergoes a career-long balanced program of training that includes fine service schools and the best civilian colleges as well as service in both command and staff capacities. Full utilization of these opportunities, combined with maximum individual effort, results in a well rounded officer capable of effective performance in this most challenging career field.

No special academic course is necessary for commission in the Infantry.

ARMOR. Armor is the combat arm with characteristics and capabilities especially designed for offensive action. The role of Armor on today's battlefield is the conduct of highly mobile ground warfare, primarily offensive in nature, and characterized by a predominance of mounted combat. Armored units concentrate their firepower at the decisive area of action to lead or accompany Infantry in destroying the enemy. This role is performed by the armored division, armored cavalry regiment, separate armor groups, and the armor elements of infantry and airborne divisions. Officers serving with Armor may anticipate rewarding assignments in these units, which provide valuable experience in working with men, machines, and weapons. Today's modern Armor combines newly acquired mobility, firepower, and shock action with the traditional dash and daring of the old Cavalry to produce a fast, hard-hitting team that truly earns its name as "The Combat Arm of Decision."

ARTILLERY. Artillery is the combat branch which is primarily concerned with the employment and firing of cannon in warfare. Its armament includes many types of guns, howitzers, rockets and guided missiles, all designed to enhance the destructive potential of the army against hostile targets on the ground, in the air, and on the water.

To combat these diversified targets, Artillery is comprised of two general types—Field Artillery and Air Defense Artillery—each type being armed with weapons and equipment commensurate with its combat responsibilities. Many of these weapons deliver an atomic warhead.

With the advent of rockets and guided missiles, an even wider field is being opened for the Artilleryman. Varieties of rockets and guided missiles, such as the Nike and the Redstone, have been developed for the use of the Artillery in coping with the higher speeds and altitudes of modern aircraft and greater ranges to ground targets. The field is open for employment of electronic equipment which will cause rockets to locate and automatically direct themselves to targets at extremely high altitudes, speeds, and ranges.

No special academic course is required for commission in the Artillery, although a demonstrated aptitude for mathematics is desirable.

THE CORPS OF ENGINEERS. The Corps of Engineers is both a combat arm and a technical service of the Department of the Army. In addition it has a civil mission. This multiple function presents a challenging and varied career for Engineer officers. Engineer military operation is worldwide, embracing most fields of engineering and construction practices in highly diversified geographical and political areas.

The civil works function of the Corps of Engineers is supervised directly by the Congress of the United States and includes river and harbor developments, flood control, canals, dams, and relief work in disaster areas.

To be commissioned in the Corps of Engineers a student must pursue a course which leads to a degree in engineering, technical or other scientific field.

THE SIGNAL CORPS. The Signal Corps is both a combat arm and a technical service of the Department of the Army. As a combat arm, its mission is to provide the communications network for all military operations from Department of the Army Headquarters to the front lines. This service is performed in peace and in war by the most practical and efficient means consistent with modern developments. As a technical service, its mission is to develop, procure, and maintain equipment used for such fields as electronics, avionics, meteorology, photography, and television. This service includes the engineering, installation, operation, and maintenance of fixed Army communications and training of signal specialists. Signal communications are the nerve system of the Army which enables coordination of effort by all branches.

Signal corps requirements for officers exist in the following fields: Communications, Electronics, and Electrical Engineering; Physics, Mathematics, Meteorology; Automatic Data Processing Systems; Operations Research; Business Administration; Personnel Management; Education; Comptrollership; Motion Picture and Television Production.

## THE TECHNICAL SERVICES

ARMY SECURITY AGENCY. The mission of the Army Security Agency is related to the application of procedures designed to insure smooth functioning of the Army's world-wide electrical communication facilities, and to deny to unauthorized persons access to information which might be detrimental to the national defense. In the United States Army Reserve, there is a separate branch designated the Army Security Reserve even though in the active Army the Army Security Agency is not a branch of the service.

No special academic course is required for a commission in Army Security Agency, though it is desirable that a majority of the personnel have a technical background in such fields as electronics, mathematics, and allied phases of engineering.

THE CHEMICAL CORPS. The Chemical Corps is charged with the investigation, research, design, and development of chemical, biological, and radiological warfare items. It is concerned with smoke and incendiary materials, toxic gases, all war gas defense appliances, and biological warfare and radiological defense activities. It furnishes advice to all elements of the Department of Defense on chemical and biological warfare and radiological defense. It is responsible for the supervision of training of the army in chemical and biological warfare and radiological defense.

To be commissioned in the Chemical Corps, a student must be pursuing a course which leads to a degree in a scientific or engineering field, with preference for the chemical, biological, and mechanical arts and sciences.

THE ORDNANCE CORPS. The Ordnance Corps provides the Armed Forces of our country with material for firepower and mobility—rifles, machine guns, artillery, ammunition, tanks, and trucks. Ordnance material ranges from time pieces to radar controlled automatic antiaircraft guns; from jeeps to ponderous tank transporters; from pistol cartridges to guided missiles.

Ordnance officers perform work closely related with business and industry. They must be businessmen, but the technical nature of Ordnance Corps activities calls for an engineering or scientific background.

To be commissioned in the Ordnance Corps, a student should pursue a course which leads to a degree in engineering, technical, or other scientific fields. However, degrees in business administration and management are often accepted.

THE QUARTERMASTER CORPS. One of the world's largest business organizations, the Quartermaster Corps supplies over 70,000 items to a million men all over the globe; in time of war this may be expanded to 85,000 items to ten million men.

Quartermaster officers of outstanding executive caliber and of potentially sound business sense design, produce, test, and supply clothing for every climate, food for every mealtime situation, and petroleum products for all purposes. These officers are at once merchants, importers, exporters, warehouse managers, purchasing agents, and expediters.

Although no special academic course is required for a commission in the Quartermaster Corps, business administration, personnel management, food technology, and petroleum engineering are recommended educational fields.

THE TRANSPORTATION CORPS. The Transportation Corps performs transportation functions for the Army and provides such transportation service to the Air Force or Navy as may be directed. Transportation officers are the Army's traffic managers as well as highway and railroad executives. The Corps is a major Army user of large transport-type aircraft, both fixed and rotary wing, in the movement of essential supplies in direct support of combat units. It has over-all responsibility for the research, development, and logistical support of Army Aviation. Constant improvement in the movement of men and supplies throughout the world challenges the initiative, leadership, and ingenuity of transportation officers in command or staff capacities, many of which are closely allied with civilian occupations.

Although no special academic course is required for a commission in the Transportation Corps, business administration, economics, and engineering are recommended educational fields.

## THE ADMINISTRATIVE SERVICES

ADJUTANT GENERAL'S CORPS. The Adjutant General's Corps provides military personnel management, Special Services activities, and administrative service for the Army establishment and for other components of the Department of Defense. The qualified Adjutant General's Corps officer is the Army's expert in administrative and personnel matters and is a key member on the Commander's Staff.

No special academic course is required for a commission in the Adjutant General's Corps although business, commerce, and psychology are recommended educational fields.

FINANCE CORPS. The Finance Corps provides finance services for the Army and other components of the Department of Defense. The activities include paying military personnel, allotments for dependents of service personnel, and paying the salaries of civilian personnel of the Army.

No special academic course is required for a commission in the Finance Corps although business and commerce are recommended educational fields.

MILITARY POLICE CORPS. The primary mission of the Military Police Corps is to assist the commander in maintenance of discipline by enforcement of law and order within the military establishment. Thus military policemen will ordinarily be found directing military traffic, patrolling streets in towns where soldiers frequently congregate; investigating crimes committed against individual soldiers, civilians, or the Army; apprehending deserters and personnel absent without leave; maintaining order aboard trains and ships; and providing security for certain types of military operations and installations.

No special academic course is required for a commission in the Military Police Corps.

# THE SCHOOL OF VETERINARY MEDICINE

The principal objective of the School of Veterinary Medicine is to provide complete training in all the phases of veterinary medicine. The degree of Doctor of Veterinary Medicine is conferred upon satisfactory completion of the curriculum in veterinary medicine. By following Curricular Option I, the student may qualify after four years of study for the degree of Bachelor of Science in Animal Science. (See Curricular Options below.)

The School of Veterinary Medicine is composed of the Departments of Veterinary Anatomy, Veterinary Medicine and Surgery, Veterinary Microbiology, Veterinary Parasitology, Veterinary Pathology, Veterinary Physiology and Pharmacology, and Veterinary Public Health. The Department of Veterinary Medicine and Surgery operates the Veterinary Hospital and Ambulatory Clinics. A large proportion of the faculty from all departments is actively engaged in research. In addition to undergraduate instruction, graduate offerings are available leading to the degrees of Master of Science and Doctor of Philosophy.

Training is such that graduates of the School of Veterinary Medicine are well qualified to deal with problems of disease and disease prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, and wild life. Graduates also are well qualified to administer and advise in the public health problems arising from intertransmission of diseases between man and the lower animals. Instruction and practical training are given in milk and meat hygiene and in the inspection of food processing plants. The School is accredited by the Council on Education of the American Veterinary Medical Association.

## PRE-VETERINARY MEDICINE

The following pre-veterinary curriculum is designed to afford the student the best possible preparation for veterinary training. Courses marked with asterisks are requirements. Substitution for other courses may be made only with the permission of the Dean of the School of Veterinary Medicine.

### Curriculum in
### PRE-VETERINARY MEDICINE

#### FRESHMAN YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 | ***Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| ***Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | ***Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| ***Chemistry 101**<br>General Chemistry | (3-3) | 4 | ***Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| ***English 103**<br>Composition and Rhetoric | (3-0) | 3 | ***English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| ***Mathematics 102**<br>Algebra | (3-0) | 3 | ***Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-2) | 1 | **Military or Air Science** | (0-2) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

#### SOPHOMORE YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| ***Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | ***Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | ***Physics 216**<br>Introductory Physics | (2-3) | 3 |
| ***Physics 215**<br>Introductory Physics | (2-3) | 3 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 19 |

NOTE: All students must complete Entomology 208 or its equivalent before the second year in Veterinary School.

Substantially the same pre-veterinary curriculum as that outlined above should be completed by students expecting to qualify for admission to the School of Veterinary Medicine in the minimum time (two college academic years). However, a student with a Bachelor of Science degree may be admitted to the professional curriculum with certain pre-veterinary deficiencies. The Dean of the School of Veterinary Medicine shall be the authority on these matters. Completion of any pre-veterinary deficiencies may be required after enrollment in the professional curriculum.

## ENTRANCE REQUIREMENTS TO PROFESSIONAL CURRICULUM

Admission to the professional curriculum in veterinary medicine is granted only for the beginning of the fall semester. Formal application must be filed with the Director of Admissions and Registrar between March 1 and May 1 of the year for which admission is sought. Accompanying the application form must be: complete academic records, including the preparatory record and college record; a record of courses in progress; a statement showing the applicant to be in good standing; and discharge certificate or certificate of separation if the applicant has served in the Armed Forces.

Minimum pre-veterinary requirements are 70 semester hours including:

| | |
|---|---|
| English composition and rhetoric | 6 hours |
| Biology (at least 4 hours must be zoology) | 8 hours |
| Inorganic chemistry | 8 hours |
| Mathematics | 6 hours |
| Organic chemistry | 8 hours |
| Physics | 6 hours |

Completion of the pre-veterinary requirements with satisfactory grades is a prerequisite for admission to the first year of the professional curriculum in veterinary medicine or to the veterinary courses of that year.

## LIMITED ENROLLMENT

Enrollment in the first year of the professional curriculum in veterinary medicine is limited by facilities of the College to a definite number each year. Selection within this quota is based on scholastic record and professonal aptitude, and admission to the curriculum in pre-veterinary medicine does not carry assurance that the student will be admitted to the first year in veterinary medicine.

Limited enrollment in the professional veterinary curriculum has resulted in the establishment of priority groups for applicants by states of residence as follows:

1. First consideration is given to qualified applicants who are residents of Texas and states with which Texas has a contract through the Southern Regional Education Board up to the limit of the quota.
2. If the quota is not filled from priority group 1, a second group of qualified applicants from states of the United States which have no schools of veterinary medicine will be considered.
3. If the quota is not filled from priority groups 1 and 2, a third group of qualified applicants will be considered from other states of the United States which have schools of veterinary medicine.
4. An exceptionally qualified candidate from any state will be considered.

## CURRICULAR OPTIONS

Three curricular options are open to students planning to study veterinary medicine.

### Option I

Students may qualify for the degree of Bachelor of Science in Animal Science, to be conferred after four years of study. Under this option the recommended pre-veterinary curriculum and the regular veterinary curriculum are followed. Elective requirements must be met by completing the following courses:

Agronomy 301; Economics 203; English 403; and Genetics 406.

Substitutions for any of the courses required for this Animal Science degree may be made only with approval of the Director of Agricultural Instruction.

### Option II

Students may qualify for a Reserve Officer's commission by scheduling advanced military or air science as electives in the first and second years of veterinary medicine. The number who are permitted to follow this option will necessarily be contingent upon the number of advanced ROTC contracts available.

### Option III

Students who do not wish to qualify either for a Reserve Officer's commission or for the Bachelor of Science degree may register for electives of their own choosing, subject to approval by the Dean of the School of Veterinary Medicine.

Wherever possible, the student should choose his option early in the pre-veterinary curriculum.

## ADMISSION TO THE THIRD YEAR OF VETERINARY MEDICINE

Regardless of the option chosen, a student may not be permitted to register for the third year of veterinary medicine unless he has completed, with an average grade of C or better, all work taken in the first two years of the veterinary curriculum.

## READMISSION

A veterinary student who voluntarily withdraws from the College, or who is dropped from the rolls of the College for cause, forfeits his standing and must apply for readmission. A student who fails any of his veterinary courses may be required to withdraw from the School of Veterinary Medicine.

## ELECTIVES

Students in the School of Veterinary Medicine who do not enroll in advanced ROTC must complete English 403 (Speaking for Professional Men). The remaining 10 credit hours of elective courses must be chosen with the approval of the Dean of the School of Veterinary Medicine.

## Curriculum in
## VETERINARY MEDICINE

### FIRST YEAR

| First Semester | Th Pr | Cr |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Anatomy 301**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 303**<br>Histology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | Th Pr | Cr |
|---|---|---|
| **Animal Husbandry 320**<br>Animal Nutrition and Feeding | (3-0) | 3 |
| **Veterinary Anatomy 302**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 304**<br>Embryology | (3-3) | 4 |
| **Veterinary Anatomy 306**<br>Neuroanatomy | (0-6) | 2 |
| **Veterinary Physiology and Pharmacology 326**<br>Physiology | (4-3) | 5 |
| **Elective** | | 3 |
| | | 20 |

## SECOND YEAR

| First Semester | Th Pr | Cr | Second Semester | Th Pr | Cr |
|---|---|---|---|---|---|
| **Veterinary Microbiology 435**<br>Microbiology and Immunology | (3-4) | 4 | **Veterinary Medicine and Surgery 416**<br>General Surgery | (1-0) | 1 |
| **Veterinary Parasitology 483**<br>Parasites of Domestic Animals | (2-2) | 3 | **Veterinary Microbiology 436**<br>Pathogenic Microbiology | (3-3) | 4 |
| **Veterinary Pathology 443**<br>General Pathology | (4-3) | 5 | **Veterinary Parasitology 484**<br>Parasites of Domestic Animals | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (2-6) | 4 | **Veterinary Pathology 444**<br>Special Pathology | (5-3) | 6 |
| **Elective** | | 3 | **Veterinary Physiology and Pharmacology 428**<br>Pharmacology | (3-0) | 3 |
| | | 19 | **Elective** | | 3 |
| | | | | | 20 |

## THIRD YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Veterinary Anatomy 501**<br>Surgical Anatomy | (0-6) | 2 | **Veterinary Medicine and Surgery 512**<br>Radiology | (2-0) | 2 |
| **Veterinary Medicine and Surgery 511**<br>Non-Infectious Diseases of Large Animals | (3-0) | 3 | **Veterinary Medicine and Surgery 514**<br>Infectious Diseases of Small Animals | (2-0) | 2 |
| **Veterinary Medicine and Surgery 513**<br>Non-Infectious Diseases of Small Animals | (3-0) | 3 | **Veterinary Medicine and Surgery 516**<br>Operative Surgery of Large Animals | (2-2) | 3 |
| **Veterinary Medicine and Surgery 515**<br>General Surgery | (4-0) | 4 | **Veterinary Medicine and Surgery 520**<br>Clinical Seminar | (0-4) | 1 |
| **Veterinary Medicine and Surgery 519**<br>Clinics | (0-4) | 1 | **Veterinary Medicine and Surgery 521**<br>Reproductive Diseases | (2-0) | 2 |
| **Veterinary Medicine and Surgery 526**<br>Obstetrics | (2-0) | 2 | **Veterinary Medicine and Surgery 524**<br>Operative Surgery of Small Animals | (1-2) | 2 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (2-3) | 3 | **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (2-2) | 3 |
| **Veterinary Public Health 533**<br>Food Hygiene | (1-2) | 2 | **Veterinary Public Health 536**<br>Infectious Diseases of Large Animals | (5-0) | 5 |
| | | 20 | | | 20 |

## FOURTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Veterinary Medicine and Surgery 561**<br>Clinical Laboratory Diagnosis | (0-2) | 1 | **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Medicine and Surgery 563**<br>Ambulatory Clinic | (0-4) | 1 | **Veterinary Medicine and Surgery 562**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 565**<br>Large Animal Clinic | (1-7) | 3 | **Veterinary Medicine and Surgery 564**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 567**<br>Small Animal Clinic | (1-7) | 3 | **Veterinary Medicine and Surgery 566**<br>Large Animal Clinic | (0-7) | 2 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-2) | 3 | **Veterinary Medicine and Surgery 568**<br>Small Animal Clinic | (0-7) | 2 |
| **Veterinary Parasitology 583**<br>Clinical Parasitology | (0-2) | 1 | **Veterinary Microbiology 596**<br>Poultry Diagnosis | (0-2) | 1 |
| **Veterinary Pathology 577**<br>Applied Pathology | (0-2) | 1 | **Veterinary Parasitology 584**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 573**<br>Pharmacy | (0-2) | 1 | **Veterinary Pathology 578**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-2) | 3 | **Veterinary Physiology and Pharmacology 574**<br>Pharmacy | (0-2) | 1 |
| | | 17 | **Veterinary Public Health 592**<br>Public Health | (2-2) | 3 |
| | | | | | 16 |

# THE GRADUATE SCHOOL

The principal objective of the Graduate School is to offer education beyond the Bachelor's level to those men who aspire to become intellectual leaders in various professions and in various fields of teaching and research.

## ADMINISTRATION

The faculty of the Graduate School consists of such members of the teaching staff and of the staffs of the Agricultural Experiment Station, the Texas Engineering Experiment Station, the Texas A. and M. Research Foundation, and the Texas Forest Service as the President may appoint on nomination by the Dean of Graduate Studies. Appointment to the Graduate Faculty is based on recognized scholarly activity, fundamental research, or professional activity.

The Dean of Graduate Studies is the representative of the Graduate Faculty and is responsible for the administration of the academic programs of all graduate students. He administers the policies and regulations set by the Graduate Council and approved by the Academic Council.

The Graduate Council is a standing committee of the Academic Council. It consists of twelve members chosen to give adequate representation to the various parts of the Graduate Faculty. The Graduate Council, acting for the Academic Council, sets the policies and rules by which the graduate programs are administered. Committees on Graduate Instruction are appointed for each of the four degree-granting schools. These committees have general jurisdiction over matters pertaining to graduate work in each of their schools and, through recommendation and representation, participate in the decisions of the Graduate Council.

## ADMISSION

A formal application is required of all persons seeking admission to the Graduate School. The application forms, which are available at the office of the Director of Admissions, should be filed not later than four weeks prior to the opening of the semester. Admission to the Graduate School cannot be granted until all the credentials enumerated in the application form have been filed.

All communications relating to admission should be addressed to the Director of Admissions. Questions on other matters concerned with graduate work should be addressed to the Dean of Graduate Studies or to the appropriate subject matter department.

## GRADUATE DEGREES

Graduate courses of study are offered leading to the degrees of:

Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Philosophy (Ph.D.)

The Master of Agriculture, Master of Education, and Master of Engineering degrees offer broader training with less technical specialization. Individual research resulting in a thesis is not included. The 36 semester hours of work required includes specified written reports.

The Master of Arts, Master of Science, Master of Business Administration, and Master of Architecture degrees are awarded to students who have received appropriate Bachelor's degrees and have thereafter successfully completed an approved advanced course of study requiring not less than one academic year of work.

The degree of Doctor of Philosophy is offered in several fields of basic science with particular emphasis on those fields related to or supporting agriculture and engineering. The Doctor of Education degree is presently offered only in Industrial Education. A student who has received an appropriate Bachelor's degree and has thereafter completed an approved program of advanced study and research may qualify for these degrees.

## PROFESSIONAL DEGREES IN ENGINEERING

The professional degrees in engineering are available to graduates of this college. These degrees are offered on the basis of acceptable professional experience, a thesis or its equivalent, and an examination. Details concerning requirements for this degree may be obtained upon application to the office of the Dean of Graduate Studies.

## RESIDENCE

The Master's degree will be conferred only after a residence at the College of at least one academic year except that this requirement may be satisfied by residence during five summer terms of six weeks each, or an approved equivalent.

The minimum period of time required for the doctoral degree is six semesters of full-time graduate study, or its equivalent, beyond the Bachelor's degree. All of the work, except as noted below, must be done in resident graduate study at some approved educational institution, and at least two of the last four semesters must be spent at the Agricultural and Mechanical College of Texas.

Candidates for the doctoral degree will normally satisfy residence requirements by either (1) two semesters of 12 hours each, or (2) one semester of 12 hours and one summer session of 12 hours.

Full-time staff members engaged in graduate study and registered for less than 12 semester hours will receive proportionate residence credit.

## GRADUATE SCHOOL BULLETIN

There is published annually as a bulletin of the College an announcement of the work of the Graduate School, in which will be found full information concerning conditions of admission and requirements for degrees, including residence, thesis, and examinations. A copy of this bulletin is available upon request at the Office of the Director of Admissions.

# COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered in the College are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

101 to 199, courses primarily open to freshmen.

201 to 299, courses primarily open to sophomores.

301 to 399, courses primarily open to juniors.

401 to 599, courses primarily open to seniors.

601 to 699, courses primarily open to graduates.

Those undergraduate courses marked at the right by a "†" may be taken for graduate credit.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

## Department of Aeronautical Engineering

Professor A. E. Cronk,
Professors Albert Gail, C. H. Samson, Jr.; Associate Professors
F. C. Hall, C. A. Rodenberger

**201. Elementary Aerodynamics. (3-3). Credit 4. I, S**
Basic aerodynamic phenomena and simplified theory; elementary aircraft performance. Prerequisites: Mathematics 122 or 210 or registration therein; Mechanical Engineering 212 or registration therein; Physics 219 or registration therein.

**301. Theoretical Aerodynamics. (3-0). Credit 3. I**
Fluid statics, kinematics, energy, momentum, similarity, viscosity, boundary layer, drag, circulation, lift, potential flow, thin airfoil theory, high lift devices. Prerequisite: Aeronautical Engineering 201.

**302. Experimental Aerodynamics. (1-3). Credit 2. II**
Wind tunnels and testing techniques. Wind tunnel calibration, airfoil pressure distribution, chord loading, airfoil drag by wake survey, boundary layer. Corrections of wind tunnel data for scale and other effects. Prerequisite: Aeronautical Engineering 301.

**303. High Speed Aerodynamics. (3-0). Credit 3. II**
Airfoil section characteristics and critical Mach Number. Span loading, fundamentals of compressible flow, pressure coefficients, critical conditions, aerodynamic heating, shock waves, compressibility effects, sweepback, and high speed data. Prerequisites: Aeronautical Engineering 301, registration in 302.

**304. Elementary Aircraft Structures. (3-0). Credit 3. I**

Airplane load analysis, external and internal loads and reactions for trusses, beams and space frameworks. Prerequisites: Aeronautical Engineering 201; Civil Engineering 305 or registration therein; Mechanical Engineering 212.

**306. Strength of Aircraft Materials. (2-3). Credit 3. II**

Mechanical properties of materials and their use in design of members subject to tension, compression, shear and bending. Combined stresses and margins of safety. Prerequisites: Aeronautical Engineering 304; Civil Engineering 305.

**401. Aircraft Design. (1-6). Credit 3. II**

Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisite: Aeronautical Engineering 303.

**403. Aerospace Materials Science. (3-0). Credit 3. I**

Study of nature of materials; elasticity, plasticity, and flow; strength; radiation and thermal effects; corrosion; welding and brazing; adhesives. Prerequisite: Junior classification.

**405. Aircraft Structures. (3-0). Credit 3. I**

Analysis of thin sheet metal structures, including shells, beams, and compression members subjected to critical loads. Prerequisite: Aeronautical Engineering 306.

**406. Aircraft Power Plant Operation. (2-3). Credit 3. II**

The use of modern instruments for testing aircraft engines; analysis of performance, design study, theory of operation. Prerequisite: Mechanical Engineering 410.

**417. Aircraft Propulsion Systems. (3-0). Credit 3. II** †

A study of the development, fundamentals, theories, construction, design, and performance of turbo-jet, ram jet, pulse jet, and rocket power plants for aircraft. Prerequisite: Aeronautical Engineering 401; Mechanical Engineering 410.

**418. Advanced Aerodynamics. (4-0). Credit 4. II** †

Theoretical and experimental aerodynamics for students majoring in aerodynamics. Theory of ideal fluid, viscous effects, compressible flow, and application to design problems. Prerequisites: Must have received at least a grade of B in Aeronautical Engineering 303 and Mathematics 307, or special permission.

**420. Aircraft Vibration and Flutter. (3-0). Credit 3. II**

Analysis of fundamental vibration phenomena with application to aircraft vibration and flutter problem. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**421. Dynamics of Airplanes. (3-0). Credit 3. II** †

Linear theory of vibrations of single and multi-degree of freedom systems; self-excited vibrations. Applications of matrix algebra. Elementary theory of flutter; landing impact, gust response, aero-elastic effects, dynamic stability. Prerequisites: Aeronautical Engineering 401; Mathematics 307 or 308.

**481. Seminar. (1-0). Credit 1. II**

Readings, reports, conferences, and discussion. Prerequisite: Senior classification in aeronautical engineering.

**485. Problems. Credit 1 to 4. I, II, S**

Special problems in aeronautical engineering assigned to individual students or groups. Prerequisites: Senior classification; approval of the Head of the Department.

**Structural Mechanics 468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

See Structural Mechanics for a full description of this course.

**Structural Mechanics 469. Analysis of Structures. (2-3). Credit 3. II** †

See Structural Mechanics for a full description of this course.

## FOR GRADUATES

**601. Principles of Fluid Motion. (4-0). Credit 4. I**

Mathematical methods of analysis are emphasized. Perfect fluid theory development. Treatment of viscosity and boundary layer phenomena. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**603. Aerodynamics of the Airplane. (4-0). Credit 4. II**

Application of vector analysis to two- and three-dimensional airfoil theory. Viscosity and compressibility. Drag of aircraft components. Static and dynamic stability criteria. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**604. Dynamics of Compressible Fluids. (4-0). Credit 4. I**

Properties of compressible fluids, dynamics of one-dimensional motion, channel flows, shock waves, methods of observation, extension to two- and three-dimensional flow, effects of viscosity. Prerequisites: Aeronautical Engineering 303 and Mathematics 307, or approval of Head of Department.

**608. Aircraft Flutter Analysis. (4-0). Credit 4. II**

Theoretical development of the structural and aerodynamic equations for two- and three-dimensional aircraft flutter. Numerical solutions in practical problems to determine flutter velocities. Methods of testing to determine vibration characteristics of aircraft. Prerequisites: Aeronautical Engineering 421 or Mechanical Engineering 459 or 617; Mathematics 307.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in aeronautical engineering.

**691. Research. Credit 2 to 6 each semester. I, II, S**

Technical research projects approved by the Head of the Department.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**

See Structural Mechanics for a full description of this course.

## Department of Agricultural Economics and Sociology

Professor T. R. Timm,
Professors R. E. Branson, J. G. McNeely, A. C. Magee, B. H. Nelson, Daniel Russell, R. L. Skrabanek; Associate Professors Harley Bebout, D. R. Davis, V. W. Edmondson, J. A. Kincannon, J. E. Miller, C. A. Moore, H. B. Sorensen, J. H. Southern, Randall Stelly, A. B. Wooten; Assistant Professors C. H. Brown, D. S. Moore, K. R. Tefertiller, R. G. Thompson, H. S. Whitney

### AGRICULTURAL ECONOMICS

**105. Introduction to Agricultural Economics. (3-0). Credit 3. I, II**

The field of agricultural economics and its relationship to other sciences. The characteristics of our economic system and basic economic concept. Survey of the farm and ranch firm and its organization and management; structure and operation of the marketing system; functional and institutional aspects of agricultural finance; governmental policies and programs related to agriculture.

**209. Principles of Cotton Classification. (0-3). Credit 1. I**

Introductory studies of cotton quality and cotton classing through practice in identifying grades, staples, and other qualities of cotton by traditional methods and by use of instruments in a modern classing room. Twenty-five thousand samples representing all varieties and areas will be used in practice.

**314. Marketing Agricultural Products. (3-0). Credit 3. I, II, S**

A general introductory course covering all the operations involved in the movement of agricultural commodities from the farmer to the final consumer; including a detailed study of the essential marketing functions of buying, selling, transportation, storage, financing, standardization, pricing, and risk bearing as they are carried out by the middlemen in our marketing system.

**321. Farm and Ranch Records and Accounts. (2-2). Credit 3. I**

Study of methods and systems of recording and analyzing farm and ranch operational data, and acquirement of skill in summarizing and using records as effective aids in more profitable farming and ranching. Laboratory work devoted to problems in keeping and using the various kinds of records and accounts. Prerequisite: Twelve hours of credit in technical agriculture.

**325. Principles of Farm and Ranch Management. (2-2). Credit 3. I, II**

Application of economic and business principles to the organization and operation of farms and ranches. Special attention to the factors influencing business profits. Laboratory work devoted to development of skills in surveying, analyzing, and reorganization of the farm or ranch for more efficient and profitable operation. Actual data from farms and ranches is used. Prerequisite: Twenty hours of credit in technical agriculture.

**404. Agricultural Marketing. (3-0). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in marketing agricultural products, consisting of some of the more common marketing problems confronting Texas farmers and ranchers, and opportunities for and methods of using marketing principles and practices in educational work with farm people. Examples based on actual marketing problems. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**413. Agricultural Cooperatives. (3-0). Credit 3. I** †

Place of cooperatives in our economic system; historical development and principles of cooperative associations. Steps in organizing an agricultural cooperative; operational aspects of cooperatives including legal considerations, financing, management, and membership relations; future role of cooperatives in American agriculture. Prerequisite: Agricultural Economics 314.

**416. Economics of Livestock Marketing. (2-0). Credit 2. I** †

An economic analysis of the livestock and meat industry; marketing practices of livestock producers; characteristics of major agencies and services; problems associated with the movement of livestock from producer to consumer. Prerequisite: Agricultural Economics 314.

**422. Land Economics. (3-0). Credit 3. I, II**

A study of the economic, institutional, and physical factors involved in the utilization and control of natural resources. Prerequisite: Economics 203.

**427. Cotton Marketing. (3-0). Credit 3. II**

Geography of supply and demand for cotton; competition of other fibers. Cotton trade procedures and price making in local, central, spinner and future markets; price risks and means of reducing risks. Cost of merchandising cotton; governmental policies and regulations. Prerequisite: Agricultural Economics 314.

**429. Agricultural Policy. (3-0). Credit 3. II** †

An analysis of the causes, nature, and effects of government participation in agriculture. Emphasis is upon the interrelationship of American agriculture and the political and economic system, public administration and interest representation. Prerequisite: Economics 203.

**430. Agricultural Finance. (3-0). Credit 3. II** †

Analysis of the capital requirements for farming and ranching and how they are obtained; principles involved in the use of each type of credit necessary to sound financial management; the risk, costs, and legal aspects of credit; the security requirements, rates, and terms of the loans available from the private and governmental lending agencies serving agriculture. Prerequisite: Economics 203.

**432. Farm and Ranch Organization and Operation. (2-2). Credit 3. II** †

Detailed problems involved in the organization and management of specific farms and ranches, covering such matters as efficiency analysis, budget preparation, layout, and improvement. Prerequisite: Agricultural Economics 325.

**443. Applied Farm Management. (2-2). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in farm management, the use of these principles in farm business planning, consideration of some of the more common management problems confronting Texas farmers, and opportunities for and methods of using the farm management approach in education work with farm people. Laboratory work based on actual farms and ranches. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**445. Applied Agricultural Policy. (3-0). Credit 3.** S

A special three-week summer course for Extension Service personnel and other professional agricultural workers, covering government functions in agriculture; goals and values of farm people; nature and significance of political and economic institutions; processes in formation and execution of agricultural policy; case studies in special agricultural policy areas; opportunities for and methods in educational work with farm people in the field of agricultural policy. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**447. Agricultural Prices. (3-0). Credit 3. I**

An analysis of the factors influencing the level of agricultural commodity prices and related nonagricultural prices; major factors affecting prices of individual farm products, their relative importance and behavior; analysis of price trends and seasonal variation; parity prices; methods of forecasting demand and prices of agricultural products; futures trading versus cash market prices. Prerequisite: Economics 203.

**452. International Trade and Agriculture. (3-0). Credit 3. II** †

World production and demand, present and potential, of agricultural commodities; world trade in farm products with emphasis on causal factors; national and international policies relating to agriculture; status of agricultural resources, technological progress in agriculture, and food requirements in major areas. The course is designed particularly for those interested in foreign agricultural service with governmental agencies or in export-import work with commercial concerns. Prerequisite: Senior classification.

**481. Seminar. (1-0). Credit 1. I**

Role of the social scientist in the agricultural industry; professional opportunities and responsibilities; individual investigations and reports; discussions with prominent leaders in the field. Prerequisite: Senior classification in agricultural economics or approval of the Head of the Department.

**485. Problems. Credit 1 to 3 each semester. I, II,** S

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisite: Prerequisite: Approval of the Head of the Department and the instructor.

## FOR GRADUATES

**602. Agricultural Market Organization and Structure. (3-0). Credit 3. I, S**

An analysis of the framework within which farm products are marketed. Institutional and functional problems in a competitive economy. Implications of horizontal and vertical integration and governmental activities. Relative influences of producers, the food and fiber industries, and consumers on market structure. Prerequisite: Agricultural Economics 314.

**603. Land Economics. (3-0). Credit 3. II**

A study of selected problems of the allocation and utilization of natural resources with special reference to government organizations, quasi-government bodies, and other interest groups. Prerequisite: Agricultural Economics 422.

**607. Research Methodology. (3-0). Credit 3. I**

A study of the scientific approach, role of theory and assumptions, bias and prejudice, attributes of problems, methods and tools of agricultural economics and sociology research. Each student is asked to critically evaluate research studies and is required to develop his thesis prospectus or its equivalent. Prerequisite: Approval of the Head of the Department.

**611. Production Economics. (3-0). Credit 3. II**

Basic principles upon which problems in agricultural production and resource use can be analyzed. Fundamental principles of production are isolated and these principles applied to agricultural data. Emphasis is placed on the conditions under which efficiency is obtained. The problems of agricultural production and resource use are treated from the standpoint of the technical unit, the firm and society. Prerequisite: Approval of the Head of the Department.

**613. Contemporary Thought in Agricultural Economics. (3-0). Credit 3. I**

A study of contemporary contributions to the thought and analyses of aggregate relationships and problems in the agricultural economy in terms of organizational efficiency and patterns in adjusting to economic development and economic fluctuations. Prerequisite: Approval of the Head of the Department.

**614. Agricultural Policy. (3-0). Credit 3. S**

An analysis of public policies and programs affecting agriculture. Development of policies and programs for agriculture and their bases. Prerequisite: Agricultural Economics 429 or approval of the Head of the Department.

**617. Economics of Consumption. (3-0). Credit 3. I**

An analysis of the consumer market for agricultural products; effects of family characteristics, such as size, age, income, and location upon consumer preferences and buying habits; motivations of consumers in buying different products; effectiveness of quality variation, packaging, and displays upon consumer purchases; the place of advertising in market creation; price policies at the retail level; and market research as a guide to marketing policies. Prerequisite: Approval of the Head of the Department.

**619. Farm and Ranch Business. (2-2). Credit 3. I**

An analysis of the interrelationships of factors affecting profits in farming and ranching. Identification of the strong and weak points in the organization and management of actual farm and ranch businesses. Special study and analysis of the management factor affords an opportunity to relate theory and practice in farming and ranching. Prerequisite: Approval of the Head of the Department.

**620. Capital Market in Agriculture. (3-0). Credit 3. S**

The role of capital in economic growth. Formation and allocation of capital in agriculture. Determinants of aggregate capital supply. Structure of the capital market for agriculture and its relationship to adjustments and technological change. Prerequisite: Agricultural Economics 430 or approval of Head of Department.

**627. Agricultural Market and Price Analysis. (3-0). Credit 3. S**

The application of economic theory to an analysis of agricultural product price determination and price behavior. Consideration of various types of applied economic and statistical research for price analysis and price forecasting. The relationship of product prices to marketing costs and consumer prices. Prerequisites: Agricultural Economics 324; Business Administration 303.

**629. Public Administration in Agriculture. (3-0). Credit 3. S**

A study of the basic theories in public administration in agriculture; techniques for accomplishing public goals; the legal basis for public agriculture programs; economic, social, and political considerations in agriculture programs; organizational structures for programs; formal and informal organizations. Prerequisite: Approval of the Head of the Department.

**641. Statistical Methods in Agricultural Economics. (2-2). Credit 3. II**

Planning the statistical research project, developing forms, selecting the sample, conducting the study, tabulating, analyses, and interpreting the data. Prerequisites: Business Administration 303 or Genetics 406 or equivalent; 15 hours of social science; approval of the Head of the Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A review of current literature, preparation of papers on selected topics, and discussions with visiting agricultural economists. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of agricultural economics. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the Head of the Department.

## SOCIOLOGY

**205. Principles of Sociology. (3-0). Credit 3. I, II, S**

The basic principles fundamental to an understanding of human relations are analyzed. Students are familiarized with the scope and objectives of sociology. The contributions of biology, geography, group life, and culture and their interrelationships in contributing to the development of personality are reviewed. Attempts are made to instill an appreciation for the complex processes of invention and social evolution which have produced our social systems and culture.

**206. Social Institutions and Processes. (3-0). Credit 3. II**

Sociological concepts and principles that are basic to an understanding of the complexity of modern society. Students, through first hand observation and course materials, are familiarized with social institutions, class structure, and social processes which produce social organization and disorganization. Major socal institutions are viewed through the standpoint of social structure and social processes and their future roles in society's operation and influence upon the individual and groups.

**304. Criminology and Juvenile Delinquency. (3-0). Credit 3. I, II, S**

Extent and cost of crime. Causes of crime. Processes of criminal behavior. Ecology of crime. Theories of criminology and penology. The police system. Criminal and juvenile courts, the indeterminate sentence, and pardon. Punishment and treatment of criminals and juvenile delinquents. Prison systems and reformatories. Probation and parole. Recidivism and reformation. Prevention of crime. Prerequisite: Junior classification.

**306. Principles of Social Work. (3-0). Credit 3. I, II, S** †

The historic development and present organization of private and public welfare agencies and social services. Distinctive techniques of the social work profession in interviewing, group work, case work, and social work organization are emphasized. Students are prepared to assume intelligent leadership on committees and boards of welfare agencies and to explore the possibilities for professional employment in this 20 billion dollar enterprise. Twelve hours of independent field work must be performed if graduate credit is allowed. Prerequisite: Sociology 205 or 6 additional hours of sociology or other social science.

**311. Social Psychology. (3-0). Credit 3. I, II, S** †

An analysis of why people behave the way they do. The effect of social experiences and of the groups people belong to upon the development of personality. How to influence and control the behavior of people. Social adjustment and maladjustment including analysis of causes. Public opinion. Prerequisite: Three hours of sociology or psychology.

**314. Social Problems. (3-0). Credit 3. I**

Significant social problems are explored from the standpoint of the social, economic, political, and physical implications operating to produce the swift impact of social change in a dynamic society. Both academic and practical adjustments or solutions to major problems are considered at the local, state, and national levels so that the student may be better equipped to assume the responsibilities of good citizenship in meeting the problems of today. Prerequisite: Sociology 205 or approval of the Head of the Department.

**315. The Family. (3-0). Credit 3. I, II**

A study of the evolution and growth of the family as the most fundamental social institution. Basic scientific research will be used to throw light on the problems of family formation, courtship, engagement, marriage, etc. Family problems, social and personal adjustment, financing, child rearing are emphasized. Prerequisite: Junior classification.

**320. Social Anthropology. (3-0). Credit 3. I, II** †

Cultural patterns of the principal cultures are analyzed to reveal social systems, institutions, customs, values, ethos, universal constants, and problems of cultural diffusion. Trainees in technical agriculture, engineering, business, education, public health, and the diplomatic service who anticipate domestic or overseas employment are acquainted with the methods for implementing social, cultural, and technological change. Adjustment of personnel to foreign cultures is emphasized. Prerequisites: Sociology 205 or approval of the Head of the Department.

**404. Rural Community Development. (3-0). Credit 3. I** †

The objective of the course is to help future agricultural workers in doing a better job in their various specialties by recognizing and understanding group processes and organization in carrying on their program. The techniques of rural community development are explored as values to total agricultural and small town development. Community development problems in underdeveloped countries will be surveyed. Prerequisite: Approval of the Head of the Department.

**407. Human Relations in Agriculture. (3-0). Credit 3. I, II, S**

This course is designed chiefly for students in technical agriculture to help them gain broader understanding of the human factors involved in a dynamic agricultural situation. This involves the analysis of interpersonal relationships, group relationships, and institutional relationships in a rapidly changing environment.

**408. Organization for Boy Scout Work. (2-0). Credit 2. II**

History and development of the Boy Scout movement. Understanding the boy and fitting a program to meet his needs. Developing adult leaders in the boy-man institutional relationship. Specialized programs such as cubbing, senior scouting, sea scouting, etc. Fitting scouting to the boy's needs and life pattern.

**412. Population Analysis. (3-0). Credit 3. II** †

Methods of demographic analysis. The influence of population numbers, birth rate, death rate, sex ratio, age composition, nativity, racial composition, and migration on social values and social structure. Theories of population growth and change and their effects on population policies. International aspects of the demographic position of the United States. Prerequisites: Twelve hours of social science; approval of instructor.

**418. Public Opinion and Social Control. (3-0). Credit 3. I** †

Analysis of processes, planned or unplanned, by which individuals are taught, persuaded, or compelled to conform to usages and life values of groups. Nature and use of public opinion and propaganda. Prerequisite: Sociology 205.

**430. Sociological Theory. (3-0). Credit 3. I**

An analysis of (1) the development of sociological concepts and their logical interrelationships and (2) the development of sociological theories based on the utilization of these concepts. Prerequisite: Sociology 205.

**481. Seminar. (1-0). Credit 1. I**

The preparation by students of papers on the role of the social scientist in the fields of research, organization, and management within the framework of social systems. Prerequisite: Senior classification in sociology.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisite: Approval of the Head of the Department and of the instructor.

## FOR GRADUATES

**601. Rural-Urban Relations. (3-0). Credit 3. I, S**

Rural, suburban, and urban trends and socio-economic conditions favoring city growth. Theories of rural and urban ecology; liabilities and assets of rural-urban fringe areas. Social status in town-country relations; rural zoning and the impact of urban culture on rural society. Highway development and rural-urban fusion. Social and economic advantage and disadvantage of metropolitan concentration. The influence of the metropolis on concepts, rules, and institutions related to property. The influence of science and technology on the metropolis. The search for the ideal city. Prerequisites: Sociology 205 or its equivalent or 12 hours of social science*.

**602. Contemporary Theory in Rural Sociology. (3-0). Credit 3. II**

The rise, spread, and development of the field of rural sociology in each of its three central phases—teaching, research, and extension. An objective appraisal of the scientific status of rural sociology and its interrelationships with other sciences. A review of the theories and contributions of past and present-day leading sociologists and other social scientists to the field of rural sociology. Prerequisite: Sociology 205 or its equivalent, or 12 hours of social science*.

**606. Rural Youth Leadership. (4-0). Credit 4. I, S**

To give special insight into the problems of our youth, and training techniques and programs needed to deal with these problems. To acquaint the advanced student with qualities, traits, techniques, attitudes, etc., of successful leaders in various fields. Prerequisite: Twelve hours of social science*.

**611. History of Social Thought. (3-0). Credit 3. I, S**

The development of social thought from ancient times to the present. Chief emphasis is placed upon sociological thinkers who have made significant contributions to the field, the theories of these men, and the background from which these theories evolved. Prerequisites: Sociology 205; 12 additional hours of social science*.

**612. The Rural Community. (4-0). Credit 4. II**

The purpose of this course is to acquaint the advanced student with the importance, problems, processes, and techniques of community development. Each student will be given an outside reading and study program to meet his particular interest and needs in his chosen field or specialty. A major purpose is to recognize the community development self-help technique as an effective method of improving rural standards of living in agriculture, health, education, recreation, beautification, etc. Prerequisite: Twelve hours of social science*.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**618. Educational Sociology. (3-0). Credit 3. S**

How our school system can strengthen our democratic way of life. The relationship of education to social organization, social change, and social control. Sociological analysis of the role of education in our society. Prerequisites: Sociology 205 or the equivalent; 9 additional hours of social science or a degree in education.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of sociology. Prerequisite: Six hours of sociology or 12 hours of supporting social science.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the instructor.

## Department of Agricultural Education

Professor Earl H. Knebel,
Professor Henry Ross; Associate Professors B. D. Cook, R. N. Craig,
J. W. Holcomb, Jr., O. M. Holt, E. S. Webb

**301. Principles of Agricultural Education. (3-0). Credit 3. I**

An introduction to the study of agricultural education, designed to acquaint the student with the principles of educational theory, the aim and meaning of education, leadership training, professional organizations, and literature. Organization and operation of Future Farmer chapters.

**425. Course Building. (2-0). Credit 2. II** †

Preparing units of instruction in vocational agriculture for all-day, part-time, and evening school classes. Prerequisite: Approval of the Head of the Department.

**426. Methods in Adult Agricultural Education. (2-0). Credit 2. II** †

Planning educational programs and activities for adult farm people in young farmer and adult classes. Developing skill in the use of the group process in teaching. Prerequisite: Approval of the Head of the Department.

**427. Methods of Developing Farming Programs. (1-2). Credit 2. II** †

Planning and supervising farm programs of vocational agriculture students. Prerequisite: Approval of the Head of the Department.

**431. Student-Teaching in Vocational Agriculture. (2-0). Credit 2. I**

Student teaching preparation including orientation in professional ethics and behavior. Selection and use of reference materials and audio-visual aids. Preparation of teaching plans for units of instruction to be taught in selected high school vocational agriculture departments. Prerequisite: Agricultural Education 301, 427, or approval of the Head of the Department.

**432. Student-Teaching in Vocational Agriculture. (2-6). Credit 4. II**

Planning for and teaching vocational agriculture in selected high school departments in Texas. Six weeks student teaching and observation in local departments of vocational agriculture. Presentation and discussion of problems encountered by practice teachers in the field. A study of current problems in teaching vocational agriculture. Prior planning required. Laboratory hours to include the six weeks student teaching. Prerequisite: Agricultural Education 431.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**441. Agricultural Extension Organization and Methods. (2-2). Credit 3. I, II, S**

Cooperative, agricultural extension service, objectives, organization and administration, operation, results, social and economic significance. Analytical approach to farm and home problems. Principles of extension teaching and measuring results. Methods in selecting, training, and using farm leaders. Principles in dealing with practical problems of planning, developing, and executing county programs. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of vocational agricultural education or extension education with emphasis on the collection, analysis, and presentation of information. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. Advanced Methods in Agricultural Education. (3-0). Credit 3. I, II, S**

An advanced course in methods of teaching vocational agriculture. Prerequisite: Professional experience or approval of the Head of the Department.

**605. Supervised Farming. (3-0). Credit 3. I, II, S**

Advanced study of supervised farming in vocational agriculture and methods of supervising students in carrying out supervised farming programs. Prerequisite: Professional experience or approval of the Head of the Department.

**607. Future Farmer and Young Farmer Activities. (3-0). Credit 3. I, II, S**

Methods of conducting Future Farmer and Young Farmer activities. Prerequisite: Professional experience or approval of the Head of the Department.

**610. Methods in Adult and Young Farmer Education. (3-0). Credit 3. I, II, S**

A study of the methods of determining educational program needs, organizing, conducting and evaluating educational programs in agriculture for adult and young farmer groups. Emphasis on coordinating and utilizing groups and resources in a community in developing agricultural programs. Suitable for teachers of vocational agriculture, county agricultural extension agents, and other professional agriculture workers. Prerequisite: Professional experience or approval of the Head of the Department.

**613. Administration and Supervision of Agricultural Education. (3-0). Credit 3. I, II, S**

Problems of organization, administration, financing, and supervision of vocational agriculture, and extension work. Prerequisite: Professional experience or approval of the Head of the Department.

**615. Philosophy of Agricultural Education. (3-0). Credit 3. I, II, S**

A study of the philosophy and evaluation of agricultural education. Emphasis on the development and use of evaluative criteria and tests in the field of vocational education in agriculture. Prerequisite: Professional experience or approval of the Head of the Department.

**616. Program Building in Agricultural Education. (3-0). Credit 3. I, II, S**

Organization of programs in agricultural education and agricultural extension education on local, state, and national basis. Securing assistance of public school administrators, farmers, and county, state, and national agricultural agencies in program building. Prerequisite: Professional experience or approval of the Head of the Department.

**619. Workshop in Agricultural Education. Credit 1 to 3. I, II, S**

A workshop offered on a one-, two-, three-, or six-week or full semester basis to study selected problems in the areas of agricultural or extension education. Committees are set up to utilize consultants in specialized areas of study. Prerequisite: Professional experience or approval of the Head of the Department.

**630. Guidance and Counseling for Rural Youth. (3-0). Credit 3. I, II, S**

Analysis of occupational and vocational opportunities for rural youth, techniques of individual group counseling and guidance. Practicum in personality and occupational interest testing. Prerequisite: Approval of the Head of the Department.

**640. Methods of Technical Change. (3-0). Credit 3. I, II, S**

The dynamics of cultural change as a theoretical framework for the process of planned technical change, the methods of planning and implementing technical change, the effects of technical change and how they can be predicted and planned, programs of planned technical change in the United States and abroad. The land grant college as an institutional vehicle for planned technical change. Especially adapted for foreign students and American educators and technicians preparing for duty abroad. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Studies related to classroom, laboratory, supervised farming, adult and young farmer education activities, and agricultural extension programs. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis for Master of Science programs only. Prerequisite: Approval of the Head of the Department.

## Department of Agricultural Engineering

Professor Price Hobgood,
Professors W. E. McCune, J. W. Sorenson; Associate Professors O. R. Kunze*, E. T. Smerdon, L. H. Wilkes; Assistant Professors W. H. Aldred, C. M. Hohn, B. R. Stewart; Instructors R. J. McGinty, D. R. Stipe

**201. Farm Power and Machinery. (2-2). Credit 3. I, II**

Construction, operation, adjustment, and servicing of farm engines and tractors. Adaptability, selection, economic utilization, construction, operation, and adjustment of the principal tillage, planting, cultivating, harvesting, and feed processing machines.

**205. Materials in Light Structures. (2-3). Credit 3. I**

Selection and utilization of materials for light structures. Specifications and cost estimation. Prerequisite: Engineering Graphics 105.

**208. Farm Machinery. (2-3). Credit 3. II**

Mechanics, design, and materials of farm machinery construction. Rotary power transmission, hydraulic controls, method of construction, functional requirement, principles of operation, safety, performance characteristics, capacity, economic utilization. Analysis of tillage, planting, harvesting and handling mechanisms. Prerequisite: Physics 218.

**213. Food Plant Engineering. (2-3). Credit 3. II**

Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.

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*On leave of absence from 9-1-61 to 8-31-62.

**221. Farm Shop. (1-3). Credit 2. I**

A course for students in agricultural education and general agriculture involving carpentry and woodwork, tool sharpening, preparation of simple drawings and bills of materials, blueprint reading, and rafter cutting.

**222. Farm Shop. (1-3). Credit 2. I, II**

A course for students in agricultural education and general agriculture involving electric and gas welding, cold metal work, forging, soldering, pipe fitting, and the preparation and use of concrete.

**301. Agricultural Structures Design. (2-3). Credit 3. I**

This course includes a study of the basic requirements of livestock buildings and storage structures including the consideration of sanitation control, environmental control, economy, convenience, and materials application. It also treats the basic requirements of the farm home. Prerequisites: Engineering Graphics 105, 106.

**324. Agricultural Engine and Tractor Design. (2-3). Credit 3. II**

Principles of farm tractor chassis design, traction devices, stability, hitches, power transmission, construction, operation and design of internal combustion engines. Engineering principles of carburetion, ignition, cooling, lubrication, hydraulic systems, and operator's comfort, convenience and safety. Methods of testing and rating tractors and power units. Prerequisites: Mathematics 307; Mechanical Engineering 212, 313, or registration therein.

**325. Farm Electricity. (2-2). Credit 3. I, II**

A course for students in agricultural education and general agriculture which covers elements of electric current generation and transmission, applications of electric heating, lighting and power, wiring motors, power rates, meter reading, safety rules and regulations.

**335. Water Control and Utilization. (2-3). Credit 3. I, II**

Elementary surveying, including chaining, leveling, and mapping as applied to farm needs. Water control and utilization emphasizing irrigation principles and practices, associated problems of drainage, and fundamentals of terracing and farm pond design.

**410. Irrigation and Drainage Engineering. (2-3). Credit 3. II** †

Engineering principles of irrigation. Water sources; measurement and distribution of water; irrigation pumps; design of surface and sprinkler irrigation systems; salinity control. Draining engineering. Design of surface and subsurface drainage systems; drainage districts and laws. Prerequisites: Agronomy 445 or registration therein; Civil Engineering 201, 311.

**413. Agricultural Structures Design. (2-3). Credit 3. II** †

Engineering principles of farm structures design; loads, reactions, and force systems; analysis and design of wood and steel beams, light frames and connections. Fundamentals of design of concrete beams, slabs, and columns as applied to agricultural buildings. Prerequisites: Agricultural Engineering 301; Civil Engineering 305.

**418. Agricultural Process Engineering. (2-3). Credit 3. I** †

Engineering principles in agricultural processing. Psychometrics and thermodynamics of air, water, water vapors and pressures, vapor transmission, drying humidification, heating, refrigeration, heat transfer, conditioning of air, fluid flow, ventilation, fan laws and air conveying. Prerequisite: Mechanical Engineering 323.

**428. Soil and Water Conservation Engineering. (2-3). Credit 3. I** †

Engineering principles of soil and water conservation. Rainfall and runoff; soil erosion by water and wind; terrace and terrace outlet design; design of agricultural reservoirs and related structures. Prerequisites: Civil Engineering 201, 311, or registration therein.

**430. Farm Electrification Engineering. (2-3). Credit 3. II** †

Principles of electricity in farm electrification. Fundamentals of alternating currents and circuits with emphasis on power, energy, resistance, inductance, capacitance and power factor. Includes the theory of magnetism and principles of transformers, generators and motors. Prerequisite: Electrical Engineering 305.

**440. Farm Electrification. (3-0). Credit 3. S** †

This course includes the fundamentals of farm wiring, lighting and the design, construction, and operation of electric water systems, refrigeration equipment, brooders, milking machines, feed processing and handling equipment, hay and grain driers, and other electric equipment used in farm production. This is a special course for teachers and prospective teachers in vocational agriculture to be offered for a three-week period during the summer.

**481. Seminar. (1-0). Credit 1. I** †

A review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.

**482. Seminar. (1-0). Credit 1. II** †

Presentation of papers dealing with new developments and results of investigations of problems related to agricultural engineering. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

Consists of selected problems in any phase of agricultural engineering. The hours of credit and specific content will depend upon the background, interest, ability, and needs of the student enrolled. Individual consultations and reports are required. Prerequisites: Junior classification; approval of the Head of the Department.

## FOR GRADUATES

**601. Instrumentation and Research Methods. (3-0). Credit 3. I**

Analysis of research techniques, study of the theory and use of instruments in research including instrumentation for research in irrigation and drainage and other phases of agricultural engineering. Also the design and use of research models and analogies, and an introduction to available research facilities. Prerequisite: Admission to Graduate School.

**602. Irrigation and Drainage. (3-0). Credit 3. II**

Theory and practice in irrigation and drainage including soil moisture and moisture movement, soil moisture measurements, erosion and sedimentation of irrigation and drainage structures, and characteristics of pumps. Also includes effect of low quality irrigation water, salinity and alkali problems and their control, efficiency of irrigation water usage, drainage methods, and legal aspects of irrigation and drainage. Prerequisite: Agricultural Engineering 410 or the equivalent.

**603. Agricultural Machinery. (3-3). Credit 4. I**

The theory and practice of functional farm machinery design. Encompasses an analysis of the problem need, the functional requirements, the common materials used, the design, testing, and production of efficient operational units.

**605. Agricultural Structures. (3-0). Credit 3. I**

A study of the structural, environmental, and economic problems encountered in agricultural buildings with special emphasis on design considerations for structural materials. Also research methods and procedures as they apply to agricultural structures. Prerequisites: Agricultural Engineering 205, 413, 418.

**606. Agricultural Process Engineering. (3-0). Credit 3. II**

Basic engineering principles involved in mechanical handling, cleaning and sorting, size reduction, conditioning, and storage of agricultural products. Includes the use of refrigeration, electric energy, and radiation. Prerequisites: Agricultural Engineering 418, 430; Mechanical Engineering 323.

**609. Farm Power. (3-3). Credit 4. II**

A study of the basic theory and principles of operation as applied to internal combustion engines used for agriculture. Emphasis is given to the application and functional design requirements and testing procedures. Prerequisites: Agricultural Engineering 324; Mechanical Engineering 323.

**613. Soil and Water Conservation Engineering. (2-3). Credit 3. I**

A study of soil and water conservation, with emphasis on the hydrology of agricultural watersheds, soil erosion theory, functional design of soil and water conservation structures, methods of reducing water losses, and experimental techniques. Prerequisites: Agricultural Engineering 428; Civil Engineering 463.

**685. Problems. Credit 1 to 4 each semester. I, II**

Advanced laboratory or field problems not related to student's thesis. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Research for the thesis or dissertation.

## Department of Air Science

C. E. Gregory, Colonel, USAF
Professor of Air Science

### UNITED STATES AIR FORCE

Associate Professors: Lieutenant Colonels R. W. Garrison, K. W. Gruber, C. B. Wells, Jr.; Majors F. F. Drake, B. F. Smith, Kenneth Wolf; Assistant Professors: Captains D. E. Allen, W. F. Atwater, B. T. Duncan, J. B. Killebrew, J. F. Martin, C. W. Piper, H. F. Weitzel

### BASIC COURSE OF AIR SCIENCE

**101. Foundations of Aerospace Power. (0-2). Credit 1. I**

First semester Basic Air Science. A survey of the various elements of aerospace power and an introduction to the composition of and necessity for national security forces.

Leadership Laboratory: Introduction to Air Force organization; drill and ceremonies; and the requirement for "followership" at element and flight level. Opportunities are provided for developing personal and group discipline and acquiring the training, poise, and self confidence necessary for leadership positions.

**102. Foundations of Aerospace Power. (0-2). Credit 1. II**

Second semester Basic Air Science. A survey of the principles of flight and aerospace vehicles and an introduction to the responsibilities of aerospace citizenship.

Leadership Laboratory: Continuation of Air Science 101 laboratory.

**201. Foundations of Aerospace Power. (0-3). Credit 1. I**

Third semester Basic Air Science. A more advanced consideration of the aerospace capabilities of the United States Air Force, including a survey of the principles of war and the evolution of aerial warfare.

Leadership Laboratory: Practice in elementary leadership activities involving small groups and an introduction to leadership methods and cadet corps organization at the group and wing level. The cadet is provided with opportunities to test his leadership skill in situations dealing with small groups and to recognize and accept personal responsibility.

**202. Foundations of Aerospace Power. (0-3). Credit 1. II**

Fourth semester Basic Air Science. Continuation of Air Science 201 to include the development of weapon systems, employment of aerospace forces in peace and war, and a consideration of the problems and possibilities of operations in space.

Leadership Laboratory: Continuation of Air Science 201 laboratory.

## ADVANCED COURSE OF AIR SCIENCE

**301. Officer Development. (0-2). Credit 1. I**

First semester Advanced Air Science. A study of Air Force organization and the functions of the commander and his staff, including Air Force conferences, staff meetings, and correspondence. Concurrent enrollment in English 210 and English 401 (or 403) is a requirement for this course.

Leadership Laboratory: Development of leadership skills dealing with larger and more complex groups (i.e., groups and wings) and an introduction to command and staff principles and methods at all levels. The cadet is provided with an opportunity to assume full responsibility for significant parts of the cadet corps program.

**342. Officer Development. (2-3). Credit 3. II**

Second semester Advanced Air Science. Leadership seminar: A study of the principles and practices of leadership to include basic psychology of leadership and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Military justice system: A study of the system by which military justice is administered.

Leadership Laboratory: Continuation of Air Science 301 laboratory.

**401. Officer Development. (0-2). Credit 1. I**

Third semester Advanced Air Science. An introduction to weather and air navigation for the Air Force officer. Concurrent enrollment in History 318 or Geography 401 is a requirement for this course. (If History 318 is taken during the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Development of leadership and management understandings and skills at the command level. The cadet is given an opportunity to plan for the achievement of group objectives and supervise the implementation of cadet planning by coordination and control through cadet corps command and staff channels.

**402. Officer Development. (0-2). Credit 1. II**

Fourth semester Advanced Air Science. Presentation of material to help the cadet make a rapid, effective adjustment to active duty as an officer of the United States Air Force. Concurrent enrollment in History 318 or Geography 401 is a requirement for the course. (If History 318 is taken the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Continuation of Air Science 401 laboratory.

## Department of Animal Husbandry

Professor O. D. Butler, Jr.,
Professors T. C. Cartwright, F. I. Dahlberg, Fred Hale, H. O. Kunkel, J. K. Riggs; Associate Professors G. T. King, A. M. Sorensen, Jr.; Assistant Professors W. C. Ellis, L. D. Wythe, Jr.; Instructors H. W. Franke, D. C. Kraemer, C. M. Laywell, F. A. Orts

**107. General Animal Husbandry. (2-3). Credit 3. I, II**

This course is a study of the selection, breeding, feeding, management, and marketing of beef cattle, sheep, Angora goats, swine, horses, and meat evaluation. An introduction to the broad field of animal husbandry; an appreciation of the importance of the livestock and meats industry in American agriculture and the American economy; basic fundamental principles of animal husbandry to create a desire to learn and study more about the field.

**302. Trends in Livestock Selection. (2-2). Credit 3. II**

The natural selection of livestock in the wild state. Domestication and adaptation to different environments. The breed concept. Balancing visual selection, pedigree, and records of performance. Prerequisite: Animal Husbandry 107.

**303. Animal Nutrition. (3-0). Credit 3. I, II**

Chemical composition of feeding stuffs; composition of farm animals; digestion; metabolism and the function of nutrients; minerals; vitamins; antibiotics, hormones, and other regulators in feeds. Prerequisite: Chemistry 227 or 231.

**307. Meats. (2-3). Credit 3. I, II**

Study and practice of slaughtering and cutting carcasses of cattle, sheep, and hogs. Meat will be cured and meat products prepared. Uses of by-products will be considered. Factors affecting quality, palatability, and economy in selection of meats will be included. The location, structure, and functions of the endocrine glands, digestive organs, and reproductive organs will be discussed in the laboratory in connection with slaughtering. Prerequisite: Animal Husbandry 107 or approval of the Head of the Department.

**309. Feeds and Feeding. (2-2). Credit 3. I, II**

A course designed to study the principal feeds and feedstuffs used in the feeding of all classes of livestock from a practical point of view; to develop in the student an understanding of the significance of the basic feed nutrients and the application of basic principles of nutrition to formulating rations for livestock production; microscopy of by-product feeds; methods of feeding; feed processing; flexible feeding programs; feed control laws; feeding investigations. Prerequisite: Animal Husbandry 303.

**313. Horse Management and Training. (1-2). Credit 2. I**

Breeding, feeding, management, and training of quarter and pleasure horses; growing and developing foals; anatomy; unsoundness; parasites and diseases; stables and equipment; shoeing; fitting for show and sale.

**315. Livestock Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of livestock for both breeding and slaughter purposes.

**317. Meats Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb.

**320. Animal Nutrition and Feeding. (3-0). Credit 3. II**

A review of the chemical aspects of animal nutrition. The role of carbohydrates, fats, proteins, vitamins, and minerals in animal nutrition. Nutritional requirements of farm animals. Formulation of rations. A study of feeds and feedstuffs which supply the nutritional requirements. For students of veterinary medicine. Prerequisite: Biochemistry and Nutrition 312.

**406. Beef Cattle Production. (2-2). Credit 3. I, II** †

Systems of production; establishing a breeding herd; mating and reproduction; performance and progeny records for selecting breeding stock; feeding and managing the breeding herd; systems of managing stockers and feeders; fattening cattle for market; farm steer beef production and commercial feedlot finishing; planning commercial and purebred cattle enterprises; fitting and showing; animal health; marketing. Prerequisite: Animal Husbandry 303.

**412. Swine Production. (2-2). Credit 3. I** †

Historical; feeding and handling the breeding herd during various seasons; culling; meat type hog selection records; the sow and the litter; growing and fattening pigs; forage crops; feeding on forage; dry lot feeding; choice and value of feeds; garbage feeding; prevention of disease; the purebred herd; fitting and showing. Prerequisite: Animal Husbandry 303.

**414. Sheep, Goats, and Fiber Technology. (3-2). Credit 4. II**

Methods of management; selection and culling; environmental factors affecting kid and lamb production; care and feeding of lambs, kids and breeding stock; marketing of sheep and goat products. Wool and mohair; grades and lengths; physical and chemical properties; processing; judging and appraisal. Prerequisite: Animal Husbandry 303 or approval of Head of Department.

**416. Livestock Management. (1-2). Credit 2. II**

A course in the feeding and management of beef cattle, sheep, swine, and horses. Especially designed for agricultural education majors. Prerequisite: Animal Husbandry 303.

**433. Reproduction in Farm Animals. (2-2). Credit 3. I, II** †

The course is designed to acquaint the students with the reproductive processes as they are exemplified mainly in cattle, sheep, swine and horses. The material presented deals with the anatomy and physiology of the male and female reproductive tracts; hormones directly controlling reproduction, estrus and estrous cycles; ovulation; mating; gestation; pregnancy tests; parturition; sperm physiology; semen evaluation; collection and storage of semen; factors affecting fertility rates and the primary causes of sterility in females and males. Prerequisite: Veterinary Anatomy 202 or approval of Head of Department.

**437. Marketing and Grading of Livestock and Meats. (2-2). Credit 3. I, II**

Factors determining market classes and grades of feeder, stocker, and slaughter animals; grading feeder, stocker, and slaughter animals; marketing machinery and handling market livestock; purebred sales; shipping losses; shrinkage; fills. Prerequisite: Senior classification.

**440. Sheep and Wool Production Problems. (2-3). Credit 3. S**

Latest developments in the feeding, breeding, and management of the sheep flock including the production, harvesting, preparation for market, and marketing of the wool clip. Special summer course for agricultural agents.

**442. Advanced Livestock Judging. (0-3). Credit 1. II**

An advanced course in the selection and grading of livestock. Prerequisite: Animal Husbandry 315 or approval of Head of Department.

**444. Large Animal Nutrition. (3-0). Credit 3. II** †

A consideration of feed energy and its utilization. A study of the metabolic and physiological bases for quantitative requirements of large animals for nutrients. Comparison of the nutrition of ruminants and monogastric animals. Prerequisites: Animal Husbandry 303; Poultry Science 411 or approval of Head of Department.

**447. Advanced Meat Selection. (0-3). Credit 1. II**

An advanced course in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb as they are correlated with live animal evaluation. Prerequisite: Animal Husbandry 317 or approval of the Head of the Department.

**481. Seminar. (1-0). Credit 1. I, II**

A review of current literature and research problems related to the livestock industry. Prominent men in the field of animal husbandry may be invited to conduct the seminar. For senior students in animal husbandry.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of animal husbandry. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**600. Advanced Livestock Management. Credit 3. S**

A special three-week workshop course for teachers of vocational agriculture to be offered during the summer. This course includes problems in all phases of animal production selected by the group under the supervision of the instructor.

**605, 606. Advancements in Beef Cattle Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of beef cattle production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of beef cattle. Prerequisites: Animal Husbandry 406; Genetics 306; or approval of Head of Department.

**619, 620. Advancements in Sheep and Angora Goat Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of sheep and angora goat production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of sheep and angora goats. Prerequisites: Animal Husbandry 414; Genetics 306; or approval of Head of Department.

**621, 622. Advancements in Swine Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relating to the various phases of swine production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of hogs; fitting swine production to the whole farm enterprise; special problems relating to the planning and operation of swine production units. Prerequisites: Animal Husbandry 412; Genetics 306; or approval of Head of Department.

**631. Physiology of Reproduction. (2-0). Credit 2. II**

A critique of scientific literature concerning the processes of reproduction in farm mammals. Students will compile, evaluate, and summarize the literature on various phases of this subject. Consideration will be given to special problems on which further investigations are desirable and methods of outlining research projects for them. Prerequisite: Animal Husbandry 433.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the field of animal husbandry. Review of current literature and presentation of papers on selected animal husbandry topics. Prerequisites: Graduate classification; major in animal husbandry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced studies in animal husbandry problems and procedures. Problems assigned according to the experience, interest, and needs of the individual student. Registration by approval of Head of Department. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the student's thesis or dissertation in the fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals, and physiology of reproduction. Prerequisite: Graduate classification.

## Division of Architecture

Professor T. R. Holleman,
Professors J. G. McGuire, M. M. Rotsch, Richard Vrooman*, R. F. White;
Assistant Professors B. H. Evans, W. G. Horseley, J. H. Marsh, III, A. L.
Stacell, W. G. Wagner, J. C. Walden, C. R. Watson, F. E.
Whitson; Instructors J. A. Cox, J. H. Hinojosa;
Lecturers Joseph Donaldson, Jr., J. W. Hall

### ARCHITECTURE

**101. Design I. (0-6). Credit 2. I, S**

Analysis and application of the principles of design, with emphasis on the visual elements and the basic concept of their organization.

**102. Design I. (0-6). Credit 2. II, S**

Extension of Architecture 101. Further study and application of the principles of design, with emphasis on the proper use of materials in the basic order of space. Prerequisite: Architecture 101.

**115. Architectural Graphics. (1-3). Credit 2. I, S**

Drafting techniques; the principles of shades and shadows; perspective drawing.

**116. Architectural Graphics. (1-3). Credit 2. II, S**

Continuation of Architecture 115; perspective drawing; techniques of architectural delineation and graphic design. Prerequisite: Architecture 115.

**201. Design II. (0-12). Credit 4. I**

Extension of first-year design principles and graphics. Studies of structures and structural materials. Site and building relationships. Design of simple buildings. Color selection. Prerequisites: Architecture 102, 116.

**202. Design II. (0-12). Credit 4. II**

Continuation of Architecture 201. More thorough detailing of design solutions, especially in small buildings. Prerequisites: Architecture 201, 205.

**205. Graphic Art. (0-6). Credit 2. I, S**

Application of principles of design to graphic art concepts, media and techniques. Prerequisites: Architecture 102 for architectural students; equivalent experience preferred for others.

**206. Graphic Art. (0-6). Credit 2. II, S**

Continuation of Architecture 205. Further application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 205 or equivalent.

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*On leave of absence from 9-1-61 to 8-31-63.

**227. Structural Principles. (3-0). Credit 3. I**

(For Design Students) Examination of structural systems and their structural, economic, and esthetic suitability as applied to architectural problems. Review of first year mathematics and an introduction to calculus as applied to structural design. Prerequisites: Mathematics 102, 116.

**228. Elements of Mechanics. (3-0). Credit 3. II, S**

Analysis of the external effects of a force system acting on a body at rest. Determination of section properties with emphasis leading to architectural structures. Prerequisite: Architecture 227 or Mathematics 223.

**253. Technology of Materials. (2-0). Credit 2. I**

A study of materials of construction, their properties, manufacture, characteristics, and uses. Prerequisite: Sophomore classification.

**254. Technology of Materials. (2-0). Credit 2. II**

Selection of materials, methods of construction. Prerequisite: Architecture 253.

**301. Design III. (0-15). Credit 5. I**

Intermediate design stressing complete solutions to individual problems. Emphasis on concept, methods, and materials of construction. Seminars dealing with architectural and related design fields. Prerequisite: Architecture 202.

**302. Design III. (0-15). Credit 5. II**

Further studies in intermediate design enlarging upon Architecture 301. Prerequisite: Architecture 301.

**305. Graphic Art. (0-6). Credit 2. I, S**

Continuation of Architecture 206. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 206 or equivalent.

**306. Graphic Art. (0-6). Credit 2. II**

Continuation of Architecture 305. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 305 or equivalent.

**325. Survey of Contemporary Art. (1-0). Credit 1. I**

A survey of the background and development of contemporary art, including the objectives, terminology, idioms, techniques and media of painting, sculpture and the graphic arts, with particular emphasis on their relation to architecture and the allied arts. Prerequisites: Junior classification for architecture students; sophomore classification for others.

**326. Survey of Contemporary Art. (1-0). Credit 1. II**

Extension of Architecture 325, with emphasis on relating contemporary art trends to cultural and technological developments. Prerequisite: Architecture 325 or equivalent.

**327. Basic Structures. (3-0). Credit 3. I**

Fundamentals of strength of materials, with emphasis on their application to architectural structures. Prerequisite: Architecture 228.

**328. Steel Structures. (2-2). Credit 3. II**

Application of the principles of statics and strength of materials to the design of architectural steel structures. Prerequisite: Architecture 327.

**331. Mechanics and Materials. (2-3). Credit 3. I**

A terminal course designed to acquaint the student with the general principles of mechanics and strength of materials and to give him some facility in their application to simple framing systems. (For student in Industrial Education.) Prerequisites: Mechanical Engineering 101; Physics 201.

**335. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. I**

To acquaint and familiarize students with types, classes, functions, and limitations of mechanical and electrical equipment and their components. Various systems of plumbing, piping, heating, cooling, electrical distribution and wiring systems are studied in their relation to building construction. Prerequisites: Physics 202; junior classification.

**336. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. II**

A continuation of Architecture 335. Further study is made of the components of mechanical and electrical equipment as to their logical applications in completed systems of plumbing, space conditioning, and electrical wiring. Prerequisite: Architecture 335.

**339. Art and Civilization. (3-0). Credit 3. I, S**

Historical survey of the cultures of man with respect to art and architecture. Prerequisite: Junior classification.

**340. History of Architecture. (3-0). Credit 3. II**

Historical study of the development of architecture from the Pre-Classic through the Greek and Roman Classic, the Early Christian, Byzantine, Saracenic, and Romanesque periods. Prerequisites: Architecture 339 for students in architecture; junior classification for others.

**401. Design IV. (0-15). Credit 5. I**

Architectural and planning problems, with emphasis on analysis, research and design. Study of relationship of architecture, landscape architecture. city and regional planning, and other related design fields. Prerequisite: Architecture 302.

**402. Design IV. (0-15). Credit 5. II**

Continuation of Architecture 401, with architectural and planning problems of a more complex nature. Prerequisite: Architecture 401.

**427. Concrete Structures. (2-3). Credit 3. I, S**

Study of reinforced concrete for architectural structures; analysis and design; systems of forming. Prerequisite: Architecture 328.

**428. Roof Structures. (2-3). Credit 3. II, S**

The analysis and design of conventional roof system; roof trusses, beams and columns, and current roof deck systems. Prerequisite: Architecture 328.

**433. Architectural Environment. (3-0). Credit 3. I, II**

Study of environmental factors related to architectural design in terms of natural lighting, natural ventilation and sound. Prerequisites: Physics 202; junior classification.

**439. History of Architecture. (3-0). Credit 3. I**

Historical study of the development of architecture from the Gothic through the Renaissance and Post-Renaissance periods of Europe. Prerequisite: Architecture 340.

**440. History of Architecture. (3-0). Credit 3. II**

Historical study of American Period architecture, and the background, principles, philosophies, and significant figures of the Contemporary Movement in America and Europe. Prerequisite: Architecture 439.

**454. Specifications and Working Drawings. (1-6). Credit 3. I, II**

Detailed specifications; supervision and superintendence; building laws and codes; working drawings. Prerequisites: Architecture 202, 254.

**500. Summer Practice. Twelve weeks; required; no credit. S**

Summer practice in architectural offices or with building contractors as the student may be registered in the Design curriculum or in the Construction curriculum. Required previous to registration for the fifth year.

**501. Design V. (0-15). Credit 5. I** †

Advanced architectural and planning problems, with emphasis on analysis, programming, research, site study, concept, consideration of related design fields, client contact and promotion. Prerequisite: Architecture 402.

**502. Design V. (0-15). Credit 5. II** †

Continuation of Architecture 501; problems of a more complex nature, with emphasis on awareness of office practice. Prerequisite: Architecture 501.

**527. Structural Systems. (2-3). Credit 3. I** †

Advanced studies in the systems of architectural structures. Prerequisites: Architecture 427, 428.

**528. Structural Systems. (2-3). Credit 3. II** †

Study of structural problems as related to actual professional practice; special consideration of design factors, new materials, codes, economy, specification surveys of costs. Prerequisite: Architecture 527.

**554. Professional Practice. (2-0). Credit 2. I, II** †

To familiarize the student with the usual problems of office practice, professional relations, ethics, building law and contracts. Prerequisite: Senior classification.

**556. City Planning. (2-3). Credit 3. I** †

Survey of planning principles and procedures; legal aspects; physical and social development of the city; housing. Prerequisite: Senior classification.

**581. Seminar. (1-0). Credit 1. II**

Seminars presented orally by students, faculty, and professional people, with subjects relating to architecture and the construction of buildings. Prerequisite: Fifth year classification.

**585. Problems. Credit 1 to 4. I, II, S**

A course which permits work on a special project in architecture, landscape architecture, or construction. Project must be approved by the Head of the Division of Architecture. Prerequisites: Fifth year classification in architecture or senior classification in landscape architecture; approval of the Head of the Division.

## FOR GRADUATES

**627. Contemporary and Creative Structures. (2-2). Credit 3. I**

Studies and analyses of contemporary and creative structures as related to architectural design, with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 528 or the equivalent.

**628. Contemporary and Creative Structures. (2-2). Credit 3. II**

Continuation of Architecture 627. Studies and analyses of contemporary and creative structures as related to architectural design with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 627.

**629, 630. History and Archaeology. (2-0). Credit 2 each semester. I, II**

Individual problems of study and research in the field of American architecture and archaeology.

**681. Seminar. (1-0). Credit 1 each semester. I, II, S**

Review of current work in architecture; original presentation on selected topics.

**685. Problems. Credit 1 to 4. I, II, S**

Individual problems involving the application of theory and practice in the design and construction of buildings and groups of buildings.

**691. Research. Credit 2 to 4 each semester. I, II, S**

Research for thesis.

## LANDSCAPE ARCHITECTURE

**201. History of Landscape Design. (3-0). Credit 3. II**

A study of the art of landscape design from the earliest efforts to the present day. Lectures, reference reading, library sketches, and reports.

**300. Summer Practice. Ten weeks, required. No credit. S**

Approved summer practice with a recognized landscape architect or nursery.

**304. Landscape Construction. (2-3). Credit 3. I**

Treatment of various phases of work included in a landscape development. Finish grading, drainage, and preparation of detailed drawings. Field practice in construction phases. Prerequisite: Civil Engineering 201.

**305. Planting Design. (1-3). Credit 2. I**

The use of plant materials in the composition of landscape design. Study of the mass form and texture of plant materials in relation to one another as well as to structures and site development. Plans, sketches, and models. Prerequisite: Landscape Architecture 302.

**320. Landscape Design I. (0-12). Credit 4. I**

Delineation of landscape forms; drafting, lettering and introductory composition, analysis and solution of typical site problems. Prerequisites: Architecture 102, 116; Floriculture 207.

**321. Landscape Design II. (0-12). Credit 4. II**

A second course in landscape design. Arranged to give a general knowledge of the various problems met in the practice of landscape architecture, including private, semi-public, and public areas. Prerequisites: Civil Engineering 201; Landscape Architecture 320.

**404. Landscape Construction. (2-3). Credit 3. I**

A continuation of Landscape Architecture 304. More advanced problems in landscape development are covered. Prerequisite: Landscape Architecture 304.

**411. Landscape Design for the Architect and Engineer. (2-2). Credit 3. I**

Designed to present the principles of, and technical requirements involved in the landscape development of residential, industrial, and other outdoor areas. Special emphasis is placed on the relationship of the architectural and engineering professions to such developments. Not open to students majoring in landscape architecture.

**420. Landscape Design III. (1-15). Credit 6. I**

Major landscape design problems and their respective applications. Private estates, parks, subdivisions, and other private and public areas. Plans, sketches, and models. Prerequisite: Landscape Architecture 321.

**421. Landscape Design IV. (1-15). Credit 6. II**

Advanced landscape design. A continuation of Landscape Architecture 420. More advanced problems as assigned with added emphasis on city and regional planning. Prerequisite: Landscape Architecture 420.

## Basic Courses

Director S. A. Kerley,
Professor D. F. Parry; Assistant Professors U. W. Crow, A. E. Denton, Jr., L. H. Hope, W. D. Kutach; Instructor R. L. Provost

**102. College Reading. (0-3). Credit 1. I, II, S**

A laboratory course designed to improve reading comprehension, reading vocabulary, and reading rate. In addition to the regular two one-hour meetings per week, two thirty-minute practice periods are required.

**103. College Study. (0-2). Credit 1. I, II, S**

A laboratory course designed to familiarize the student with the principles of learning and their application to the study of specific college subjects. Planning study activities, notetaking, basic textbook study methods, examination skills, preparing reports, and other factors related to academic success are considered in this course. Self-tests and exercises for improving basic abilities and achievements in various courses are provided.

**105. The World of Work. (0-2). Credit 1. I, II**

A course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas will be studied intensively and each student will be given an opportunity for studying his aptitudes and interests and relating them to various vocational requirements.

**106. Survey of Man's Knowledge. (0-2). Credit 1. II**

A survey course designed to acquaint the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature will be investigated.

## Department of Biochemistry and Nutrition

Professor C. M. Lyman,
Professors J. R. Couch, H. O. Kunkel, J. M. Prescott, Raymond Reiser, L. R. Richardson; Associate Professors B. J. Camp, J. W. Dieckert, U. G. Whitehouse

**312. Veterinary Physiological Chemistry. (3-6). Credit 5. I**

A study of the chemical nature of physiological processes, including the synthesis and breakdown of body tissues and the chemical changes undergone by metabolites from ingestion to excretion. Variations among domestic animals in normal and abnormal conditions will be considered. Prerequisite: Chemistry 228.

**401. Human Nutrition. (3-0). Credit 3. I** †

A study of the functions of food constituents in health and in physiological stress. The economic, national, and international aspects of human nutrition. Prerequisite: Junior classification.

**410. Introductory Biochemistry. (3-3). Credit 4. I** †

The chemistry of the major constituents of living organisms. Biophysical and biochemical processes in plants and animals are stressed. The laboratory work includes the application of quantitative analytical procedures to plant and animal tissues and fluids. Prerequisites: Chemistry 223 and 231 or 228.

**430. Electron Microscopy. (2-3). Credit 3. II** †

Descriptive treatment of various aspects of electron microscopy and laboratory practice employing selected specimens. Elementary discussion of electron optics, design of electron microscopes, photographic plates, underfocusing, overfocusing, asymmetry, colloidal state, shadow casting. Biological and physical science applications in all technical departmental fields of the College given equal attention. Prerequisite: Senior or graduate classification in a physical or biological science, or approval of the instructor.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit laboratory investigations or the study of subject matter not included in established courses. Prerequisite: Approval of Head of the Department.

**Animal Husbandry 444. Large Animal Nutrition. (3-0). Credit 3. II** †

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 411. Poultry Feeding. (3-2). Credit 4. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**611. General Biochemistry. (3-0). Credit 3. I**

Chemistry of the principal constituents of living cells, with an introduction to intermediary metabolism. Prerequisites: Chemistry 207 or 316, 228.

**612. Laboratory Procedures in Biochemistry. (0-6). Credit 2. I**

A laboratory course designed to familiarize the student with the application of chemical and biological methods to the solution of fundamental biochemical problems. Prerequisite: Biochemistry and Nutrition 611 or registration therein.

**613. Vitamins. (3-0). Credit 3. II**

The role of vitamins in animal nutrition and their occurrence in plant and animal tissues. Prerequisite: Chemistry 228.

**614. The Determination of Vitamins and Minerals. (0-3). Credit 1. II**

A laboratory course designed to familiarize the student with methods for the determination of vitamins and minerals in biological materials. Prerequisite: Biochemistry and Nutrition 613 or registration therein.

**615. Experimental Animal Procedures. (0-3). Credit 1. II**

A laboratory course involving the management, preparation of purified rations, and the production and cure of nutritional diseases. Prerequisites: Biochemistry and Nutrition 613, 614 or registration therein.

**618. Chemistry and Metabolism of Lipids. (2-0). Credit 2. II**

An advanced course in lipid chemistry and metabolism. Prerequisite: Biochemistry and Nutrition 611.

**619. Proteins. (2-0). Credit 2. I**

Advanced studies on the chemical, physical, and biological properties of proteins. Particular emphasis will be placed on the biological synthesis and metabolism of proteins. Prerequisite: Biochemistry and Nutrition 611.

**620. Advanced Biochemical Techniques. (0-6). Credit 2. S**

A laboratory course involving practice in the use of special techniques and instruments employed in biochemical research and the isolation, identification, and analysis of biological compounds. Preparation of representative enzymes and laboratory work on factors affecting their action. Prerequisites: Biochemistry and Nutrition 612, 624.

**624. Enzymes. (2-0). Credit 2. II**

General principles of enzyme chemistry. The physical chemistry of enzyme action. Types of enzymes and coenzymes. Enzymes in the patterns of metabolism. Prerequisites: Biochemistry and Nutrition 611; Chemistry 324 or 342; or approval of instructor.

**626. Radioisotopes Techniques. (2-3). Credit 3. I**

A general course on the nature and utilization of isotopes in chemical and biochemical studies. History, general properties of nuclei, nuclear reactions, radiations; health physics and instrumentation will be included. Prerequisites: Chemistry 316, 317; Physics 201, 202.

**627. Mineral Nutrition and Metabolism. (2-0). Credit 2. II**

A study of the role of minerals in animal nutrition with emphasis on physiological function, biochemical interrelationships with other minerals and other nutrients, deficiency symptoms and nutritional significance. Prerequisite: Biochemistry and Nutrition 410 or 611.

**630. Metabolism. (3-0). Credit 3. II**

A descriptive consideration of the various chemical pathways of metabolism. Prerequisites: Biochemistry and Nutrition 611, 613.

**632. Radioactive Tracer Techniques in Metabolism. (1-3) or (1-6). Credit 2 or 3. II**

The use of isotopes in measuring the metabolic pool, precursor-product relationships, isotopic competition, cycles and intermediates, isotopic dilution and double dilution, permeability, adsorption and absorption and assay of common elements. Prerequisites: Biochemistry and Nutrition 611, 612, 626, or approval of instructor.

**634. Techniques in Lipid Chemistry. (0-6). Credit 2. II**

This course is designed to acquaint the student with recently developed techniques in chemical and biochemical investigations. Prerequisites: Biochemistry and Nutrition 612, and 618 or registration therein.

**640. Clinical Chemistry. (2-6). Credit 4. II**

A study of the quantitative distribution of body constituents and their physiological interpretations. Prerequisites: Biochemistry and Nutrition 312 or 410 or 611, or Biology 433, or Veterinary Physiology and Pharmacology 427.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

The study and discussion of original articles in biochemistry and nutrition and related fields designed to broaden the understanding of problems in the field and to stimulate research.

**685. Problems. Credit 1 or more each semester. I, II**

An advanced course in biochemical laboratory procedures including preparations and instrumentation. Problems designed according to the experience, interests, and needs of the individual student.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Laboratory facilities are available for original investigations in various phases of biochemistry and nutrition. Prerequisite: Approval of major advisor.

**Genetics 631. Biochemical Genetics. (2-0). Credit 2. I**

See Genetics Section in the Department of Plant Sciences for a full description of this course.

# Department of Biology

Professor J. G. Mackin,
Professors S. O. Brown, L. S. Dillon, W. J. Dobson, H. L. Gravett, S. H. Hopkins, Charles LaMotte, G. E. Potter, J. J. Sperry; Associate Professors E. H. Gibbons, G. M. Krise, A. B. Medlen, N. P. Wood; Assistant Professors W. J. Clark, F. H. Kasten*, C. E. Miller; Instructors J. L. Boswell, R. W. Flournoy, W. V. Robertson

Courses in the biological sciences administered by the Department of Biology include sequential programs in botany, microbiology, and zoology. All courses, irrespective of subject matter area, bear the departmental designation (Biology), and a course number from a single numerical sequence. The nature of the offerings is more clearly indicated, however, by the subject matter grouping shown on the following pages.

## GENERAL BIOLOGY

**115. Survey of Biology. (3-3). Credit 4. I, II**

A summarization of biological forms and principles and their impact upon man and his affairs.

**225. Personal and Public Health. (2-0). Credit 2. I**

A general introduction to personal and community health. Designed primarily to enable the individual to utilize available knowledge and facilities to raise the health standard of his home and community.

**330. Life Science. (2-0). Credit 2. I, II**

Readings of grouped essays covering fifteen of the major subdivisions of life science together with integrating lectures designed to fit each into its place in life and industry. Prerequisite: Junior classification. (Not open to those with more than 7 hours of credit in biology.)

**337. Organic Evolution. (2-0). Credit 2. I, II**

A study of the evidences of the evolution of plants, animals, and man. Phylogeny and interrelationships of living things, the main lines of evolution, variation and the origin of species will be studied; man and the future considered.

**439. The Development of the Biological Sciences. (2-0). Credit 2. II**

A survey of the beginnings and development of biological discoveries and the lives and contributions of men who were outstanding in the general field of biology before 1900. Prerequisite: Fifteen hours of biological science.

**481. Seminar in Biology. (1-0). Credit 1. I** †

Recent advances. For graduates and advanced undergraduate majors in either microbiology, botany, or zoology. May be repeated once for credit not to exceed two hours.

**482. Seminar in Biology. (1-0). Credit 1. II** †

Integration of the branches of biological science. May be repeated once for credit not to exceed two hours.

**485. Biological Problems. Credit 1 to 4. I, II**

Problems in the various phases of plant, animal, and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

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*On leave of absence from 2-1-61 to 8-31-62.

## FOR GRADUATES

**600. Teaching of High School Biology. (2-3). Credit 3. S**

A study of the problems and techniques of teaching biology in the secondary school, along with appropriate subject matter. The laboratory work emphasizes those exercises, projects, and materials which are most useful in the high school biology laboratory and in stimulating interest in the subject. Prerequisite: Approval of the Heads of the Biology and Education and Psychology Departments.

**654. Radiation Biology. (3-0). Credit 3. II**

Lecture and demonstration reviewing the physical theory of radiations important to living organisms with especial emphasis on ionizing radiation: X-ray, gamma, alpha, beta and neutron. Survey of the effects of ionizing radiations on biological systems. Prerequisite: Graduate classification in biological or agricultural science.

**660. Aquatic Ecology. (2-3). Credit 3. II**

A study of fresh water as an environment; its physical and chemical characteristics; the plant and animal communities which inhabit it; and the mechanisms by which the physical and chemical characteristics and the interactions of the biological populations affect the distribution, population dynamics, and productivity of the aquatic organisms. Prerequisites: Biology 327 and 435 or the equivalent; graduate classification or approval of the instructor.

**661. Cellular Physiology. (2-3). Credit 3. I**

A consideration of the physiochemical nature of the cell and its relationship to the environment with emphasis on conversion of energy and matter as required by the cell as a living unit. Prerequisites: Graduate classification in biology or animal or plant science; approval of the instructor.

**681. Seminar. (1-0). Credit 1. I, II**

Detailed reports on specific topics in the field chosen. Prerequisite: Graduate classification in the appropriate field.

**685. Problems. Credit 1 to 4 each semester. I, II**

Limited investigations in fields other than those chosen for thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Prerequisite: Approval of ranking professor in the field chosen.

## BOTANY

**101. General Botany of Seed Plants. (2-3). Credit 3. I, II**

The seed plant as a living unit; external and internal structures in relation to life processes; reproduction and life history.

**102. Taxonomy of Flowering Plants. (2-3). Credit 3. I, II**

Designed to give training in the use of keys and in the identification of flowering plants, family characteristics and relationships, and other applied phases of plant science. Prerequisite: Biology 101.

**327. Fundamental Plant Morphology. (2-3). Credit 3. I**

Structural, reproductive, and taxonomic features of representatives of the major plant groups, with particular attention to groups not covered in Biology 101. Prerequisite: Biology 101.

**349. Plant Taxonomy. (2-3). Credit 3. S**

Study and identification of the flora of selected areas, techniques of collection and preparation of plant specimens. Studies in plant distribution and relationships. Prerequisite: Biology 101 or 115.

**353. Mycology. (2-3). Credit 3. II** †

An introduction to the study of fungi, including structure, reproduction, ecological relationships, and taxonomic aspects. Prerequisites: Biology 101, 206, or approval of instructor. (Offered in 1962-63 and in alternate years thereafter.)

**453. Plant Anatomy. (2-3). Credit 3. I** †

Fundamental anatomy of the vegetative and reproductive organs of the plant with emphasis on development of tissue types. Technique of staining and mounting of plant tissues. Prerequisite: Six hours of plant sciences including Biology 101 or the equivalent.

## FOR GRADUATES

**608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

A study of the form, structure, reproduction, and ecology of the algae, with detailed work on selected locally available forms, both marine and fresh water. Prerequisite: Biology 327 or 353 or approval of the instructor. (To be offered in 1962-63 and in alternate years thereafter.)

**615. Cytology. (2-6). Credit 4. I**

An intensive study of the organization and activities of the cell, with emphasis on topics related to cytogenetics and cytotaxonomy. Prerequisites: Genetics 301; approval of the instructor.

**619. Systematic Botany. (2-6). Credit 4. I**

Principles of taxonomy. Phylogenetic considerations and criteria used in schemes of classification. History of classification. Nomenclature and identification. Field and herbarium techniques. Prerequisites: Biology 102, 327, or approval of the instructor.

**620. Systematic Botany. (2-6). Credit 4. II**

Survey of Angiosperms with emphasis on relationships. Biosystematics and modern taxonomy. Procedures in monograph preparation. Monographers. Field and herbarium techniques with problems designed for individual needs and interests. Prerequisite: Biology 619 or approval of the instructor.

**623. Plant Morphology. (2-6). Credit 4. II**

A study of the anatomical, reproductive, and organogenetic features of representative vascular plants; emphasis on economic forms. Prerequisite: Biology 327 or the equivalent.

**651. Mycology. (2-6). Credit 4. II**

Detailed studies of the fungi, with emphasis on life cycles of representative forms; genetics and cytology; principles of taxonomy; ecology and geographical distribution. Prerequisite: Biology 353 or approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

## MICROBIOLOGY

A major in microbiology offers thorough and comprehensive training in the biology of bacteria and certain of the algae, fungi, and protozoa that supplement the study of the microorganisms in their relation to medicine, industry, and agriculture. The curriculum is intended to equip the student with sound training in the principles of microbial life, as either preparation for graduate study or for a career in either industrial or civil service.

**206. Introductory Microbiology. (2-4). Credit 3. I, II**

Relation of microorganisms to agriculture, industry, and health of man, animals, and plants. Prerequisites: Chemistry 102 or 104; 3 hours of biology.

**351. Fundamentals of Microbiology. (3-3). Credit 4. I**

Basic microbiology; comparative morphology, taxonomy, pathogenesis, ecology, variation, physiology of microorganisms. Required for students majoring in biology. Recommended for science majors. Prerequisites: Chemistry 227; 3 hours of biology; or approval of the instructor.

**438. Bacterial Physiology. (2-6). Credit 4. I**

A detailed study of the physiological activities of bacteria. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1962-63 and in alternate years thereafter.)

**457. Bacterial Ecology. (2-6). Credit 4. II** †

Relation of bacteria to their environment, especially to other microorganisms. Methods of isolation, identification, and differentiation. Prerequisite: Biology 206. (Offered in 1962-63 and in alternate years thereafter.)

**Biology 353. Mycology. (2-3). Credit 3. II** †

See page 259 for a full description of this course.

**Dairy Science 320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

See Department of Dairy Science for a full description of this course.

**Dairy Science 326. Food Bacteriology. (3-3). Credit 4. II** †

See Department of Dairy Science for a full description of this course.

## FOR GRADUATES

**635. Physiology of Microorganisms. (2-6). Credit 4. I**

An advanced consideration of the physiological activities of bacteria with special emphasis on metabolism. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1962-63 and in alternate years thereafter.)

**647. Industrial Microbiology. (2-6). Credit 4. II**

Microorganism as the basis of industrial processes. Practice includes antibiotic assay; analysis of products of metabolism, and fermentation balances. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1961-62 and in alternate years thereafter.)

**Biology 608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

See page 259 for a full description of this course.

**Biology 630. Protozoology. (3-3). Credit 4. II**

See page 262 for a full description of this course.

**Biology 651. Mycology. (2-6). Credit 4. II**

See page 259 for a full description of this course.

**Plant Physiology and Pathology 607. Physiology of the Fungi. (3-0). Credit 3. II**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

**Plant Physiology and Pathology 618. Bacterial Plant Diseases. (2-3). Credit 3. II**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

**Plant Physiology and Pathology 620. Plant Viruses. (2-0). Credit 2. I**

See Plant Physiology and Pathology Section of the Department of Plant Sciences for a full description of this course.

## ZOOLOGY

**107. Vertebrate Zoology. (2-3). Credit 3. I, II**

Structure, physiology, and development of animals; emphasis on the biology of vertebrates.

**108. Invertebrate Zoology. (2-3). Credit 3. I, II**

Classification, comparison, anatomy, and physiology of invertebrate animals. Specimens from the more important invertebrate phyla are studied in the laboratory. Prerequisite: Biology 107 or approval of instructor.

**217. Comparative Anatomy of Vertebrates. (2-4). Credit 3. I**

Comparative anatomy of the Prochordates and the lower vertebrates through Reptilia. Laboratory animals: Molgula, Dolichoglossus, Amphioxus, Squalus, Necturus, and Phrynosoma. Prerequisites: Biology 107, 108.

**218. Comparative Anatomy of Vertebrates. (2-4). Credit 3. II**

Comparative anatomy of birds and the mammals. Laboratory animals: the chicken and the cat. Prerequisite: Biology 217.

**219. Mammalian Anatomy. (2-3). Credit 3. I**

Principles of normal anatomy of cat and man. Nature and causes of mechanical injuries of man. Prerequisite: Biology 107.

**220. Physiology and Hygiene. (2-3). Credit 3. II**

A continuation of Biology 219. Normal and abnormal physiology of man. Prerequisite: Biology 219.

**325. Physical Anthropology. (3-0). Credit 3. II**

Man's relation to and position in the animal kingdom. Physical characteristics of mankind. Fossil and living types. Races and racial characteristics. Somatotypes. Prerequisite: Three hours of biological science.

**335. Gross and Microscopic Vertebrate Anatomy. (2-3). Credit 3. I**

Study of selected features of anatomy, embryology, and histology with emphasis on higher vertebrates. Although the cat is used as the laboratory animal, another vertebrate may be chosen if warranted and approved by the instructor. Prerequisite: Biology 107 or the equivalent.

**343. Histology. (2-3). Credit 3. I** †

Normal tissues of vertebrates including histogenesis of some. Histogenesis and organography of mammalian tissues reviewed. Prerequisite: Biology 217 or 335.

**344. Embryology. (2-3). Credit 3. II** †

Introduction to general and comparative vertebrate embryology; emphasis on early development of frog, chick, and pig. Prerequisite: Biology 217 or 335.

**422. Microtechnique. (1-6). Credit 3. II** †

Standard methods in the preparation of permanent microscopic slides of plant and animal tissues. Prerequisite: Twelve hours of biological science.

**433. General Physiology. (3-3). Credit 4. I** †

Fundamental physiology of protoplasm; basic processes and functions of organs and systems. Emphasis is placed on digestion, respiration, metabolism, excretion, muscular contraction, and reproduction. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

**434. Circulatory and Nerve Physiology. (2-3). Credit 3. II** †

Comparative functions of the circulatory, nervous system, and of the organs of special sense. Prerequisites: Biology 218; or Biology 107 and senior or graduate classification in an animal science.

**435. Advanced Invertebrate Zoology. (3-3). Credit 4. I** †

Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisite: Biology 107 or approval of the instructor.

**436. Animal Parasitology. (3-3). Credit 4. II** †

Study of parasitic worms and protozoa; laboratory methods in parasitology. Prerequisite: Biology 435 or equivalent.

## FOR GRADUATES

**603. Advanced Vertebrate Zoology. (1-5). Credit 3. II**

Phylogeny of vertebrates based on comparative anatomy, histology, embryology, and distribution. Prerequisites: Biology 218, 343, 344, or the equivalent.

**604. Advanced Embryology. (1-5). Credit 3. I**

Comparative and experimental studies of the mechanics of embryonic development. Prerequisites: Biology 218, 343, 344, or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**627. Helminthology. (3-3). Credit 4. I**

A study of the parasitic worms, especially Trematoda, Cestoda, Nematoda, and Acanthocephala. Prerequisite: Biology 436. (Offered in 1962-63 and in alternate years thereafter.)

**630. Protozoology. (3-3). Credit 4. II**

Morphology, taxonomy, physiology, reproduction, phylogeny, ecology, and life history of both free living and parasitic protozoa. May be taken concurrently with parasitology. Prerequisite: Biology 108. (Offered in 1961-62 and in alternate years thereafter.)

**632. Methods in General Physiology. (2-6). Credit 4. II**

Methods for the quantitative study of metabolism, respiration, circulation, excretion, movement, and other basic physiological phenomena. Recent advances in physiological methods to be presented on a seminar basis. Prerequisite: Biology 433 or the equivalent.

**649. Biology of the Endocrine Glands. (3-3). Credit 4. I**

A study of the structure, development, comparative anatomy, and physiology of the endocrine glands of the different animal groups. Prerequisites: Three hours of either anatomy or anatomy and physiology.

**653. Zoogeography. (3-0). Credit 3. II**

A study of the distribution of animals during geologic and present times; emphasis on the role of ecology and the effects of geography upon terrestrial and marine distribution. Prerequisite: Twelve hours of biological sciences, including at least 3 hours of advanced courses.

**656. Analytical Histology. (2-6). Credit 4. II**

Designed to acquaint the student with certain quantitative histochemical techniques in plant and animal science as applied to nucleoproteins, carbohydrates, lipids, and enzymes. Presentation of cytological evidences which aid in localizing the activities of nucleoproteins in cell metabolism. Prerequisites: Biology 343 or 453 or the equivalent; Chemistry 227.

## Division of Business Administration

Professor R. M. Stevenson,
Professors P. B. Goode, T. R. Hamilton, S. C. Hoyle, Jr.; Associate Professors R. L. Elkins, H. G. Kenagy, T. D. Letbetter, W. S. Manning, E. S. Packenham, J. E. Roche, N. A. Stewart, Jr., H. G. Thompson, W. E. Whittington; Assistant Professors R. D. Amason, H. M. Courtney, J. H. Dozier, W. E. Eckles, D. C. Lowe, J. E. Oliver, J. L. Sandstedt, D. F. Simons, W. C. Tadlock, R. D. Thompson; Instructors R. T. Ames, R. A. Krupinski, H. F. Lyles, W. L. Thornton

**105. Introduction to Business. (3-0). Credit 3. I, II**

Provides an over-all picture of business operations, develops a business vocabulary, and directs the thinking of each student to the field of business best suited to his interest and talent. Subject matter includes an analysis of the specialized fields within the business organization and of the role of business in modern society.

**205. Marketing. (3-0). Credit 3. I, II, S**

A study of institutions, processes, and problems involved in transferring goods from producers to consumers, with emphasis on economic and social aspects.

**206. Purchasing and Control of Materials. (2-0). Credit 2. I, II, S**

Operation of a purchasing department in a manufacturing business; organization of the department; specifications, standards, contract provisions; sources of supply; methods of perpetual inventory.

**208. Advertising. (3-0). Credit 3. I, II**

Place of advertising in business; advertising media, such as the newspaper, tradepaper, magazine, direct mail, poster, and the radio; description of the various methods of advertising; development of copy and layout of advertisements; consumer habits and psychology; methods of investigations for advertising campaigns; cost of advertising; legal and ethical problems involved in advertising; consideration of advertising from the standpoint of consumers. Prerequisites: Business Administration 205; Economics 203.

**216. Building Products. (0-2). Credit 1. II**

A study of building products, their physical properties, and their markets. Prerequisite: Business Administration 205.

**227. Principles of Accounting. (3-3). Credit 4. I, II, S**

An introductory course designed to serve as a foundation for study of advanced accounting and to furnish a knowledge of accounting which will be of value to students in other fields. The subject matter includes: analysis and recording of business transactions; use of journal and ledger; trial balance and work sheet; adjusting and closing entries; accounting statements; payroll records and payroll taxes; introduction to partnership accounting; special journals and ledgers; business papers and business procedures related to accounting; voucher system.

**228. Principles of Accounting. (3-3). Credit 4. I, II, S**

A continuation of Business Administration 227. Internal control; partnership and corporation accounting; accounting for manufacturing concerns; analysis and interpretation of statements. Prerequisite: Business Administration 227.

**303. Statistical Method. (3-3). Credit 4. I, II, S** †

Collection, tabulation, presentation, and analysis of data. A study of sampling, graphics, averages, ratios and coefficients, dispersion, skewness, probability and error, index numbers, seasonal and long-time trend, barometers, correlation. Prerequisite: Mathematics 102.

**304. Business Cycles and Business Measurements. (3-0). Credit 3. I, II, S** †

An empirical and statistical study of economic fluctuations; theory, causes and control of business cycles; business barometers and forecasting. Study of economic and statistical services. Prerequisite: Business Administration 303.

**305. Business Law. (3-0). Credit 3. I, II, S** †

Nature and scope of law; court system; homestead and exemption laws of Texas; law of contracts; principal and agent; business organizations, including partnerships and corporations; the Texas community property laws. Prerequisite: Sophomore classification.

**306. Business Law. (3-0). Credit 3. I, II, S** †

Additional studies in the law of business, dealing with bailments, carriers, mortgages, suretyships, negotiable instruments, banks and banking, wills and estates, sales, bankruptcy. Prerequisite: Business Administration 305.

**308. Law of Private Corporations. (3-0). Credit 3. I, II** †

Powers and limitations of the corporate form of business organization as distinguished from other forms of business enterprise. Legal problems encountered in formation, management, financing, and dissolution of corporations. Rights of corporate stockholders and creditors. Legislative control under state and federal statutes. Prerequisite: Business Administration 306.

**310. Credits and Collections. (2-0). Credit 2. II**

The elements of mercantile and consumer credit; organization of a credit department; sources of credit information; collection tools and procedures.

**312. Statistical Charts and Graphs. (2-0). Credit 2. II**

Graphic presentation of statistical data, construction of charts, calculating charts and nomographs, statistical maps, rate of change analysis, visual aids in presenting business reports. Prerequisite: Business Administration 303. (Offered in 1962-63 and in alternate years thereafter.)

**315. Insurance. (3-0). Credit 3. I, II, S**

A general introductory course dealing with the theory and practice of insurance and its economic and social significance. A critical examination is made of the various types of life, fire, and automobile contracts available for protection against personal and business risks. In addition a brief study is made of state and federal insurance plans, suretyship, and other casualty and property coverages. Prerequisite: Sophomore classification.

**316. Office Management. (2-0). Credit 2. I, II, S**

The problem of office management; the function of the office manager; office systems, handling of correspondence, filing, mailing; office furniture and equipment; office forms and supplies and their control; the office building and the office layout; selection, training, and compensation of office personnel; office manuals and reports; budgetary control in the office.

**317. Punch Card Methods. (1-2). Credit 2. I, II, S**

Instruction and practice in the operation of punch card machines for the handling of accounting and statistical data. Prerequisites: Business Administration 228, 303.

**318. Wholesale Merchandising. (3-0). Credit 3. I, II**

A presentation of the basic principles and economic functions of the wholesaler. Also a study of the modern wholesaleing systems and the operation and management of a wholesale business. Prerequisites: Business Administration 205; junior classification.

**320. Life Insurance. (3-0). Credit 3. I** †

This basic life insurance course presents the fundamentals of life insurance and annuities for the future life underwriter. The economic background of life insurance, and the various life insurance and annuity contracts are discussed relative to their utilization in private life and business. Included are fundamentals of rate-making, reserves, cash surrender values, dividends, and the selection of risks. Prerequisite: Business Administration 315.

**322. Property Insurance. (3-0). Credit 3. I** †

A study of the principles and practices of property insurance designed for those who enter either the property and casualty insurance or property management fields. The course includes fire and allied lines contracts, consequential losses, protection of the mortgagee, transportation insurance (both ocean and inland), multiple line contracts, and rate-making. Prerequisite: Business Administration 315.

**324. Casualty Insurance and Suretyship. (3-0). Credit 3. II** †

This course places emphasis upon the principles of casualty insurance and surety bonding. Employer's liability insurance is studied in conjunction with workmen's compensation insurance. The liability risks of business, professional, and personal activities are discussed. Theft, disability, aviation, glass, power plant, and credit insurance are discussed. Prerequisite: Business Administration 315.

**325. Retailing. (3-0). Credit 3. I, II, S**

Fundamental operations of retailing concerns and the need for effective coordination of retailing activities. Prerequisites: Business Administration 205; Economics 203, 204.

**327. Intermediate Accounting. (2-3). Credit 3. I, S**

Working papers and preparation of statements; correction of books and statements; special phases of corporation accounting; cash and receivables; inventories, investments. Prerequisite: Business Administration 228.

**328. Intermediate Accounting. (2-3). Credit 3. II, S**

Investments; tangible and intangible fixed assets; liabilities; reserves; statement analysis; statement of application of funds; cash-flow statement; statements from incomplete records; quasi-reorganizations, business combinations, divisive reorganizations; income tax allocation; price-level impact on financial statements. Prerequisite: Business Administration 327.

**329. Elementary Cost Accounting. (3-0). Credit 3. I, II, S**

Development of cost accounting principles relating to material, labor, and manufacturing expenses; basic cost accounting practices and procedures, with special emphasis on job order costing; survey of principles and practices of process cost accounting. Prerequisite: Business Administration 228.

**330. Advanced Accounting. (3-0). Credit 3. I, S** †

Special phases of partnership accounting; joint ventures; consignments; installment sales, accounting for insurance costs; statement of affairs and accounting for insolvent concerns; compound interest; home office and branch accounting. Prerequisite: Business Administration 328 or registration therein.

**332. Cost Accounting. (3-0). Credit 3. II, S**

Advanced process cost procedures, costing of joint and by-products, estimated cost, standard costs, managerial reports and analysis for cost control, direct costing, break-even analysis. Prerequisite: Business Administration 329.

**337. Data Processing. (2-2). Credit 3. I, II**

Use of electronic computers for recording and reporting, sorting; searching; collating; file maintenance; integrated data processing; coding of information; tables and approximations; storage of information; practical application. Prerequisite: Junior classification.

**344. Marketing Problems. (3-0). Credit 3. II** †

A study of the problems involved in the marketing of industrial and consumer goods; the problems connected with customer relations, channels of distribution, brands, sales promotion, pricing, and legislation. Prerequisite: Business Administration 325.

**352. Personal Finance. (2-0). Credit 2. I, II**

Personal and family accounts; budgets, budgetary control; bank accounts; charge accounts; borrowing; investing; insurance; standards of living; renting; home ownership; wills, trust plans. Not open to business administration students for credit.

**402. Accounting Systems. (2-0). Credit 2. II** †

Survey of accounting systems in current use by different types of businesses. System design and installation. Manual and machine procedures. Prerequisite: Business Administration 328.

**403. Income Tax. (3-0). Credit 3. I, II** †

Income tax legislation; the present income tax law and regulations; treasury decisions, court decisions, and departmental rulings; income tax problems and returns. Prerequisite: Business Administration 327.

**406. Managerial Accounting. (3-0). Credit 3. II** †

A study of the uses of accounting information by management. Emphasis is placed on accounting procedures and reports essential to management. Cost analysis, cost control, budgeting and controllership. Prerequisite: Business Administration 329.

**407. Auditing. (3-0). Credit 3. I** †

Auditing procedures used by internal auditors and independent public accountants; preparation of working papers. Prerequisites: Business Administration 328, 329.

**408. Auditing. (3-0). Credit 3. II** †

A continuation of Business Administration 407. Work on an audit practice case with preparation of working papers and audit report, case studies involving auditing problems in special situations. (Required of students who plan to enter public accounting.) Prerequisite: Business Administration 407.

**409. Survey of Accounting Principles. (3-0). Credit 3. I, II, S** †

A survey of accounting designed for students majoring in engineering and architecture. The course provides for a survey of accounting procedures, basic elements of cost accounting, and the preparation and interpretation of financial statements. The course is not as comprehensive as Business Administration 227, 228, is not open to students in business administration, agricultural administration, or liberal arts. Prerequisite: Junior classification.

**416. Oil Production Accounting. (3-0). Credit 3. II**

A study of the systems and procedures for the acquisition of undeveloped oil properties, development of oil properties, and production of crude oil. Emphasis is placed upon the work in the accounting department of a crude oil producing company and the accounting treatment of intangible development costs, depletion allowance, and oil pipe line operations. Prerequisites: Business Administration 227, 228.

**418. Corporation Finance. (3-0). Credit 3. I, II, S** †

A survey of the principles underlying the financial practices and financial management of the modern business corporation. A study will be made of advantages and disadvantages of the corporation, sources of long-term and short-term credit, working capital, surplus and dividend policy, expansion and combination problems, and failure and reorganization. Prerequisite: Economics 203 or the equivalent.

**420. Principles of Investment. (3-0). Credit 3. I, II, S** †

An analysis of the character of various investment risks, comparison of investment media, and a study of the securities market. Theories and financial tools vital to decision making concerning the structure of the security portfolio and changes in that structure to adapt most advantageously to changing economic conditions and particular needs are investigated. Prerequisite: Business Administration 418.

**422. Personnel Problems of Industry. (3-0). Credit 3. I, II, S** †

The relation of the worker to his employer, the methods of job finding, interviewing aids, occupational trends, scientific management, the functions and structure of personnel departments, employee welfare activities, and other problems of contemporary industrial development. Prerequisite: Junior classification.

**423. Personnel Policies and Techniques. (3-0). Credit 3. I, II, S** †

Programs and agencies which workers and employers have developed to improve their economic and social status; job analysis, description, and classification; wage and salary problems and procedures; personnel records. Prerequisite: Business Administration 422.

**427. Insurance Law. (3-0). Credit 3. II** †

Law cases on insurance to develop an understanding of the methods of administrative control by the state; typical clauses of insurance policies, and their interpretation by the courts; technical legal pitfalls; case examples from all forms of insurance coverage; Texas insurance law. Prerequisite: Business Administration 305.

**428. Real Estate Titles and Conveyances. (3-0). Credit 3. I, II, S** †

The ownership and transfer of titles to real property, including deeds, easements, urban and rural property with special attention to zoning, building codes, private restrictions and conditions. The law of fixtures, timber and crops, mortgages and liens, building contracts, plans and specifications, performance bonds, mines and minerals, contracts of sale, escrow and earnest money agreements, real estate brokers, sufficiency of property description, and other matters related to real property. Prerequisite: Business Administration 305.

**430. Cost Accounting Survey. (3-0). Credit 3. II, S** †

An introductory cost accounting course following Business Administration 409, for architects, engineers, and agricultural students. Purposes and uses of cost accounting; elements of cost; unit costs for use in bidding on contracts; comparison of cost procedures; job order and process costs, budgets, and standard costs; cost reports. Prerequisite: Business Administration 409.

**432. Security Analysis. (3-0). Credit 3. II** †

Methods of analyzing individual security issues, establishment of principles of selection and protection of security holdings, setting up sound and workable tests of safe investments, including financial statement analysis, understanding rights and interests of investors in senior securities and owners of common stock. Prerequisite: Business Administration 420.

**433. Business Management. (3-0). Credit 3. I, II, S**

The course deals with fundamental concepts and principles of business organization and management. The functions of planning, organizing, motivating, and controlling are examined relative to their application to firms of varying size and nature. Problems inherent in organizational relationships are appraised and possible solutions are developed and discussed. Prerequisite: Junior classification.

**434. Problems in Finance. (3-0). Credit 3. II** †

The course presents a series of comprehensive financial problems confronting the management of large and small businesses. The analysis and solution of the problems utilize the techniques and methods acquired in previous courses. The case system is used to give the student practice in linking up the related legal, accounting, and financial aspects of each situation. Prerequisite: Business Administration 418.

**435. Salesmanship. (3-0). Credit 3. I, II, S**

A consideration of the general principles of successful personal selling. Particular attention is given to personal requisites, qualifications, and training programs to enable the student to become a successful salesman. Prerequisites: Business Administration 205; Economics 203, 204.

**436. Sales Management. (3-0). Credit 3. II, S** †

A consideration of the problems confronting the modern sales executive; organization of sales departments, product research, selection and recruiting; compensation plans, routing, supervision, and costs connected with sales administration. Prerequisite: Business Administration 435.

**437. Applied Life Insurance. (3-0). Credit 3. II** †

This course presents the legal and social aspects of life insurance. Problems of reinsurance, company organization, and financial position are examined within their regulatory framework. Consideration is given to all forms of government life insurance and the benefits under the Social Security Act. A study of the elements of programming and the fundamental uses of settlement options are included. Prerequisite: Business Administration 320.

**440. Real Estate Fundamentals. (3-0). Credit 3. I**

Basic factors and agencies which comprise the structure of our modern real estate development. A study of the historic, economic, legal, and financial aspects of realty and the effect of their interplay on the institution of real property, both urban and rural. Designed for the home and business property owner as well as for the professional real estate man.

**442. Real Estate Practice. (3-0). Credit 3. II**

A study of the practical techniques and procedures employed in real estate transactions, with emphasis on real estate appraisal, sales, finance, and industrial property management. Prerequisite: Business Administration 440 or approval of the instructor.

**445. Marketing Research. (3-0). Credit 3. I** †

A study of the nature and uses of marketing research in business. Emphasis is on methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: Business Administration 205, 303.

**446. Marketing Industrial Products. (2-0). Credit 2. II** †

Management aspects and economic factors affecting marketing policies are considered. Special emphasis is given to marketing research, marketing policies, channels of distribution, brand policy, pricing and control of marketing operations as they affect industrial products. A term project involving a report on the marketing of a specific industrial product is required of each student. Prerequisites: Business Administration 205, and Business Administration 303 or Mathematics 116.

**447. Advertising Procedures. (3-0). Credit 3. I**

Study of advertising procedures for newspapers, magazines, radio, and television. Specific topics include retail, mail order, national, and industrial advertising; advertising agencies; advertising research; and advertising campaigns. Prerequisite: Business Administration 208.

**452. Veterinary Jurisprudence. (3-0). Credit 3. II**

A study of Texas statutes and court decisions regulating and affecting the practice of veterinary medicine. One of the primary functions of this course is to prepare the student for the State Board Examination in veterinary law. Prerequisite: Senior classification in the School of Veterinary Medicine.

**456. Applied Salesmanship. (0-2). Credit 1. II**

A practical course in personal salesmanship. Analysis of specific products; planning and execution of the interview; psychological aspects of selling. Particular stress is made on sales demonstration and the strategy involved in closing the sale. Prerequisites: Business Administration 435; English 403.

**461. Retailing Building Products. (2-0). Credit 2. I**

A study of the special problems of the dealers in building products. Prerequisite: Business Administration 325.

**463. Employee Supervision. (2-0). Credit 2. II** †

A study of the relationships of the first level of management to supervisors and to the staff. The objectives, organization, and tools of the supervisory level; how to handle problems of grievances, absenteeism, discipline, morale, induction, safety, and training of workers. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Statement Analysis. (3-0). Credit 3. II, S**

An analytical study of the different kinds of statements for the guidance of executives, investors, and creditors; balance sheet and profit and loss ratios. Prerequisite: Business Administration 327 or 430.

**602. Consolidated Statements. (2-0). Credit 2. II**

Consolidated balance sheets, consolidated income and surplus statements, holding companies, mergers. Prerequisite: Business Administration 330. (Offered in 1962-63 and in alternate years thereafter.)

**603. Price Analysis. (3-2). Credit 4. I, S**

Economic concepts relating to prices, statistical methods of analyzing prices, supply and demand curves, elasticity of demand, price forecasting, study and criticism of works on price analysis. Term paper required on factors affecting the price of a commodity. Prerequisites: Business Administration 303; Economics 203, 204.

**604. Statistics. (3-2). Credit 4. II, S**

Curve fitting and empirical formulas. Multiple correlation, mathematical and graphic. Sampling and measures of unreliability. Chi-square test. Analysis of variance and covariance. Prerequisites: Business Administration 303; Mathematics 102. Mathematics 110 is recommended.

**605. Accounting Problems. (3-0). Credit 3. I**

A study of advanced accounting theory and problems dealing primarily with corporation accounting, assets and liabilities, analysis of statements, and cost accounting. The problems considered will be the type currently stressed in accounting examinations. Prerequisite: Approval of instructor.

**606. Accounting Problems. (3-0). Credit 3. II**

A continuation of Business Administration 605. The topics will deal primarily with partnerships, fiduciaries, home office and branch, insurance, and auditing. Prerequisite: Approval of instructor.

**607. Market Analysis. (3-0). Credit 3. I**

A critical analysis of selected problems in the field of marketing. Each member of the class will be required to present a term report on some specific problem in the field of distribution. Prerequisites: Business Administration 205, 303.

**609. Management Seminar. (3-0). Credit 3. I, S**

A case study course covering the interrelated functions of production, distribution, and finance. Problems and situations confronting top and middle management are critically examined. Quantitative tools and techniques of accounting, statistics, and mathematics are employed to provide a framework for analysis and decision making. Prerequisite: Approval of instructor.

**612. Advanced Taxes. (2-0). Credit 2. II**

A study of special income tax problems of taxpayers; Federal estate and gift taxes; Texas inheritance tax; Texas franchise tax on corporations; claims for refund of taxes; preparation of protests to deficiency assessments; planning for tax savings. Prerequisite: Business Administration 403. (Offered in 1961-62 and in alternate years thereafter.)

**616. Governmental and Institutional Accounting. (3-0). Credit 3. I, S**

A study of the accounting principles and procedures peculiar to governmental units and institutions. Prerequisite: Business Administration 328. Economics 412 is recommended.

**619. Legal Principles Relating to Accounting. (3-0). Credit 3. I, S**

An intensive study of legal principles emphasizing those which arise in the practice of accounting.

**620. Law and Business. (3-0). Credit 3. I**

Students write a paper on a topic of law in which they are interested, approved by instructor. Also, the following topics are covered: law and business, their relation to each other; present sources of law in Texas today; community property laws of Texas; collection of judgments in Texas; ad valorem taxes; automobile accidents and other topics relating to business. (Offered in 1962-63 and in alternate years thereafter.)

**622. Trade Regulations. (3-0). Credit 3. II, S**

Delineation of governmental control intended to promote free competition and curb its abuses. A study of the Federal anti-trust acts and their application by the courts; the Federal Trade Commission and its method of dealing with unauthorized business practices such as unfair competition, misleading advertising, price discrimination, and retail price maintenance. Prerequisite: Business Administration 305.

**630. Problems of Corporation Finance. (3-0). Credit 3. I**

The financial problems of the profit-seeking corporation are discussed from the viewpoint of the corporate financial officer. Consideration is given to such matters as current financing, financial aspects of promotion, refunding operations, dividend policies, and corporate reorganization. The course is designed to exercise the principles of corporation finance. Prerequisite: Business Administration 418. (Offered in 1962-63 and in alternate years thereafter.)

**631. Business Investigation and Analysis. (3-0). Credit 3. II**

The problems arising in the quantitative and qualitative analysis of railroad, public utility, and industrial securities are presented so as to train the advanced student of investments in the use of the tools of security analysis. The text material is supplemented by the consistent use of representative sources of investment information. Prerequisite: Business Administration 418. (Offered in 1961-62 and in alternate years thereafter.)

**634. Statistical Method Applied to Business Problems. (3-0). Credit 3. II**
The use of statistical methods applied to sales control, cost studies, personnel management, forecasting sales and production of an individual concern, and forecasting general business activity. Readings, reports, and problems. Prerequisites: Business Administration 303, 604. (Offered in 1962-63 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**
A critical examination of the subject matter presented in current periodicals, recent monographs and bulletins. Separate seminars will be conducted as required in fields such as accounting, finance, marketing, personnel administration. and statistics.

**685. Problems. Credit 1 to 3 each semester. I, II, S**
Directed study on selected problems not covered in the thesis research or in other courses. Prerequisites: Graduate classification; approval of instructor.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis.

## Department of Chemical Engineering

Professor J. D. Lindsay,
Professors W. D. Harris, C. D. Holland; Associate Professors W. B. Harris,
W. W. Meinke; Assistant Professors L. D. Durbin, P. T.
Eubank; Instructors R. R. Davison, N. E. Welch

**204. Elementary Chemical Engineering. (3-0). Credit 3. I, II**
An introduction to the fundamentals of chemical engineering which involves the solution of elementary problems on the application of mass balances, energy balances, equilibrium balances, rate of approach to equilibrium, and economic balances. Prerequisites: Chemistry 102 or 104; Mathematics 122 or 210 or registration therein.

**304. Unit Operations. (3-0). Credit 3. I, II** †
A study of fluid and heat flow, evaporation and drying. Prerequisite: Chemical Engineering 204.

**314. Unit Operations Laboratory. (0-3). Credit 1. II** †
Laboratory work based on Chemical Engineering 304. Prerequisite: Chemical Engineering 304.

**409. Oil and Gas Technology. (3-0). Credit 3. I** †
Application of the principles of chemical engineering to the treatment and processing of petroleum and its products. Emphasis is on unit operations. Prerequisite: Chemical Engineering 423.

**423. Unit Operations. (3-0). Credit 3. II, S** †
A continuation of Chemical Engineering 304 covering distillation, gas absorption, filtration, size reduction, separation, and mixing. Prerequisite: Chemical Engineering 304.

**426. Plant Design. (2-6). Credit 4. II** †
The solution of problems involved in the design and development of chemical engineering plants. These problems cover such factors as the capacity, selection, and location of equipment, reaction rates, economic balances, specifications, drawings, cost estimates, and plant location. Prerequisite: Chemical Engineering 441.

**428. Industrial Chemical Processes. (3-0). Credit 3. II**

A study of representative chemical manufacturing processes and their relationships. Prerequisite: Chemical Engineering 441.

**429. Oil and Gas Technology Laboratory. (0-3). Credit 1. I** †

Laboratory work to accompany Chemical Engineering 409.

**433. Unit Operations Laboratory. (0-3). Credit 1. I** †

Laboratory work based on Chemical Engineering 423. Prerequisite: Chemical Engineering 314.

**441. Chemical Engineering Unit Processes. (3-0). Credit 3. I**

A study of such unit processes as sulfonation, nitration, hydrogenation, and alkylation, and the equipment required for them. Prerequisites: Chemical Engineering 423; Chemistry 228.

**454. Chemical Engineering Thermodynamics. (3-0). Credit 3. I** †

A study of the applications of thermodynamics to chemical engineering processes and operations. Prerequisites: Chemical Engineering 423; Chemistry 324.

**461. Process Control and Instrumentation. (2-0). Credit 2. I** †

A study of the fundamental principles and methods used in the measurement and control of the process variables such as pressure, temperature, and flow rate. Prerequisite: Chemical Engineering 423.

**464. Chemical Engineering Kinetics. (3-0). Credit 3. II** †

An introduction to the kinetics of reactions and the application of fundamental principles to the design and operation of commercial reactors. Prerequisites: Chemical Engineering 441, 454.

**481. Seminar. (1-0). Credit 1. I**

Oral discussion of selected topics from recent technical publications. Prerequisite: Senior classification.

**485. Advanced Problems in Chemical Engineering. Credit 1 to 5. I, II**

Special problems in chemical engineering are assigned to individual students or groups. The work may cover the numerous particular problems in chemical engineering processes or operations. It may be laboratory work or conference and discussion. Prerequisites: Chemical Engineering 423; approval of the Head of the Department.

## FOR GRADUATES

**605. Chemical Engineering Economics. (3-0). Credit 3. I**

Advanced calculations involving process design and process control as limited by least cost or maximum profit. Problems are based on the various unit operations and unit processes. Prerequisite: Chemical Engineering 423.

**606. Unit Operations. (3-0). Credit 3. II**

Applications of chemical engineering fundamentals in the manufacture of chemicals, refining petroleum, and other allied industries. Prerequisite: Chemical Engineering 423.

**607. Thermal Cracking. (3-0). Credit 3. I**

Application of fundamentals of chemical engineering to process calculation on thermal cracking. This includes process control and process design. Prerequisite: Chemical Engineering 606.

**608. Heat Transmission. (3-0). Credit 3. I**

Process and process design calculations on equipment involving the transfer of heat by conduction, convection, and radiation. Prerequisite: Chemical Engineering 423.

**611. Furnace Design. (3-0). Credit 3. II**

Process designs of furnaces. Involves radiant and convection heat transmission. Prerequisite: Chemical Engineering 608.

**612. Distillation. (3-0). Credit 3. I**

Process and process design calculations involving distillation of multicomponent and complex systems. Extractive and azeotropic distillation are covered. Prerequisite: Chemical Engineering 423.

**616. Estimation of Investment Cost. (2-0). Credit 2. II**

Simplified methods of estimating cost of process equipment in the preparation of preliminary appraisals. Prerequisite: Chemical Engineering 423.

**617. Unit Processes in Petroleum Refining. (4-0). Credit 4. I**

Calculations involving the effect of process variables on product yield and quality, rate of reaction, operating cost, and investment cost. Processes such as alkylation, isomerization, catalytic cracking, polymerization, thermal cracking, etc. will be covered. Prerequisites: Chemical Engineering 454, 616.

**618. Appraisal and Presentation of Chemical Engineering Data. (3-0). Credit 3. II**

Emphasis will be placed on analysis of experimental data. Practice is obtained by writing reports based on specific problems. Prerequisite: Chemical Engineering 423.

**619. Corrosion and Materials of Construction. (3-0). Credit 3. I**

The uses of materials of construction to preclude high corrosion rates in process equipment. Prerequisite: Chemical Engineering 423.

**623. Applications of Thermodynamics to Chemical Engineering. (3-0). Credit 3. II**

A study of the applications of thermodynamics to chemical engineering operations and processes. Prerequisite: Chemical Engineering 454.

**624. Chemical Engineering Kinetics I. (3-0). Credit 3. I**

A study of rates and mechanisms of chemical reactions. Thermal and catalytic reactions both homogeneous and heterogeneous are considered. Prerequisite: Chemical Engineering 423.

**625. Chemical Engineering Kinetics II. (3-0). Credit 3. II**

A study of the physical factors affecting chemical reaction rates and of methods for design of reacting equipment. Prerequisite: Chemical Engineering 624.

**626. Oil and Fat Technology. (3-0). Credit 3. I**

A study of the composition and properties of oils and fats, methods of extraction and purification, and their industrial utilization. Prerequisites: Chemical Engineering 423; Chemistry 228.

**627. Oil Mill Operation. (2-6). Credit 4. I**

A study of the theoretical and practical operating characteristics of the various units used in vegetable oil production. The economic factors of each unit and their over-all effect on plant operation will be covered. Prerequisite: Chemical Engineering 626 or registration therein.

**661. Nuclear Chemical Engineering. (3-0). Credit 3. I**

This course has to do with the applications of chemical engineering to reactors and the utilization and disposal of residual products therefrom. It will cover such problems as materials of construction, corrosion, industrial utilization of reactors, the influence of radiation on materials, and the utilization of radiation from reactor residues to influence chemical reactions. Prerequisites: Mathematics 308; Physics 312.

**662. Nuclear Material Processing. (3-0). Credit 3. II**

This course has to do with the special applications of unit operations and unit processes to the handling of nuclear fuels and residual products from nuclear reactors. It will cover such topics as distillation, gaseous diffusion separation, liquid-liquid extraction, liquid-solid extraction, gas-solid extraction, ion-exchange, adsorption separations, benefication and metallurgical processing. Prerequisites: Chemical Engineering 423; Mathematics 308.

**681. Seminar. (1-0). No credit. I, II**

Graduate students will be required to attend one hour per week to discuss problems of current importance in connection with their research.

**685. Problems. Credit 1 to 6. I, II, S**

Special work to suit individual or small group requirements. The work may cover the numerous particular problems in chemical engineering processes and operations. It may be laboratory work or conference and discussion. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Problems of unit operations and unit processes. For maximum credit comprehensive thesis must be prepared which is of sufficiently high calibre to permit a publication in the scientific and technical journals. Prerequisite: Approval of Head of Department.

## Department of Chemistry

Professor P. K. Calaway,
Professors J. K. Gladden, C. K. Hancock, A. F. Isbell, E. B. Middleton, R. N. Traxler, R. D. Whealy, B. J. Zwolinski; Associate Professors R. B. Alexander*, J. B. Beckham, Alfred Danti, Derek Gibbons, E. A. Meyers, J. O. Page, Henry Rakoff, N. C. Rose, Fred Sicilio, R. E. Snuggs, R. A. Zingaro; Assistant Professors R. M. Hedges, D. R. Lee; Instructors P. D. Cratin, W. W. Spurlock, B. J. Yager

**101. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

**102. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental theories of structure and activity. Practical application of the more important chemical processes involving metals described. Organic chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

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*On leave of absence from 9-1-60 to 8-31-62.

**103. Chemical Principles. (3-3). Credit 4. I**
A course in chemical principles and their application. For the student of superior aptitude and interest.

Laboratory work will provide study of experimental techniques and their application to chemical principles with more opportunity for individual experimentation. Prerequisites: This course is suggested for entering students with high scores on the algebra and chemistry placement examinations.

**104. Chemical Principles. (3-3). Credit 4. II**
A continuation of Chemistry 103. Laboratory work consists mainly of semi-micro qualitative analysis with ample opportunity for individual experimentation. Prerequisite: Chemistry 103.

**106. General Chemistry. (3-3). Credit 4. II**
A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

**207. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**
A considerable portion of the classroom time is devoted to chemical calculation involved in the practice.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. Prerequisite: Chemistry 102 or 104.

**223. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**
Stress is placed on the basic principles and theories of quantitative analysis, both gravimetric and volumetric. The treatment is not highly mathematical. The laboratory work is designed to illustrate basic techniques. Not open to engineering students. Prerequisite: Chemistry 102 or 104.

**225. Elementary Organic Chemistry. (2-0). Credit 2. I**
A study of the hydrocarbons and their relation to the field of petroleum. Prerequisite: Chemistry 102 or 104.

**226. Chemical Calculations. (2-0). Credit 2. I**
An advanced review of the chemical calculations of general chemistry with special emphasis on stoichiometry and chemical equilibrium. Prerequisite: Chemistry 102 or 104.

**227. Organic Chemistry. (3-3). Credit 4. I, II, S**
An introduction to the chemistry of the compounds of carbon. A study of general principles and their application to various industrial processes.

The laboratory work serves as a basis of the course; the student here familiarizes himself with the reactions, properties, and relations of typical organic compounds. Prerequisite: Chemistry 102 or 104.

**228. Organic Chemistry. (3-3). Credit 4. I, II, S**
A continuation of Chemistry 227. Prerequisite: Chemistry 227.

**231. Elementary Organic Chemistry. (3-0). Credit 3. I, II, S**
A study of the aliphatic series of organic compounds including an introduction to the benzene series and to vitamins, proteins, and related substances. Applications are taken from the field of agriculture. Not open to engineering students. Prerequisite: Chemistry 102 or 104.

**316. Quantitative Analysis. (2-6). Credit 4. I, II, S**
An introduction to the methods of exact analysis as preliminary training for the more advanced courses. In the classroom the practice and theory of the laboratory exercises are dealt with by lectures and recitations. Special

attention is given to stoichiometry.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. The work is first volumetric, then gravimetric. In the early periods samples of known composition and purity are analyzed. Prerequisite: Chemistry 102 or 104.

**317. Quantitative Analysis. (2-6). Credit 4. II** †

An introduction to the theory and practice of gravimetric, optical, and electrical methods of analysis. Prerequisite: Chemistry 316.

**323. Physical Chemistry. (3-3). Credit 4. I, II** †

Explanation and mathematical development of the theories and principles of chemistry. Topics discussed are atomic structure, gas laws, thermodynamics, thermochemistry, liquids, solutions, osmotic pressure, and colloids. Experiments in the laboratory substantiate the theories and principles developed in the classroom. Prerequisites: Chemistry 207 or 316; Mathematics 122 or 210.

**324. Physical Chemistry. (3-3). Credit 4. II, S** †

Intensive study of homogeneous and heterogeneous equilibria, the phase rule, chemical kinetics, catalysis, hydrogen-ion concentration, electrolytic and galvanic cells and electrochemistry, photochemistry, and radioactivity. Prerequisite: Chemistry 323.

**342. Physical Chemistry. (3-3). Credit 4. II** †

Explanation of basic chemical theories and principles with reference to their relationship to transformations in living matter. Special emphasis on such topics as atomic structure, diffusion and osmotic pressure, colloids, chemical equilibrium, catalysis, reaction velocity, hydrogen-ion concentration and its importance in biological processes. Prerequisites: Chemistry 207 or 316, and 227.

**344. Physical Chemistry. (3-0). Credit 3. I**

Structure of atoms, molecules, and crystals. Valence. Theories of polarity and ionization. Properties of gases, liquids, solids, and fugacities. Solubilities and properties of solutions. Study of colloids and surface energy. Equilibria. Electromotive force and oxidation potentials. Prerequisites: Chemistry 207; Mathematics 121 or 209; Physics 219.

**380. Chemical Bibliography. (1-0). Credit 1. II**

A study of the chemical library with instruction in the use of chemical journals, reference books, and other sources of information. Prerequisite: Junior classification.

**447. Qualitative Organic Analysis. (2-6). Credit 4. I** †

The identification of the principal classes of organic compounds. Prerequisite: Chemistry 228.

**450. Colloidal Chemistry. (3-3). Credit 4. I** †

A study of the theories and preparation of disperse systems. Prerequisites: Chemistry 228, 324.

**461. Physical Chemistry. (3-0). Credit 3. I** †

This course covers those topics in undergraduate physical chemistry which are not covered in Chemistry 323 and 324. The course content includes surface phenomena, colloids, atomic structure, molecular structure and properties. Prerequisite: Chemistry 324.

**462. Inorganic Chemistry. (3-0). Credit 3. I** †

The periodic relationship of the elements, their compounds, principles of their bonding and applications. Prerequisite: Chemistry 324.

**463. Inorganic Chemistry. (2-3). Credit 3. II** †

A continuation of Chemistry 462. Laboratory work consists of preparation and analysis of inorganic compounds designed to introduce the student to basic preparative techniques. Prerequisite: Chemistry 462 or approval of instructor.

**481. Seminar. (1-0). Credit 1. II**

Oral discussion of selected topics from technical publications.

**485. Problems. Credit 1 to 4. I, II, S**

An introduction to research, library, and laboratory work. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**600. Survey of Chemistry. (2-3). Credit 3. S**

A survey course in chemistry designed for teachers of high school chemistry. Prerequisites: Graduate classification; approval of Heads of Departments of Chemistry and of Education and Psychology.

**607. Organic Techniques and Preparations. (1-6). Credit 3. II**

A study of laboratory operations theory and a description and comparison of equipment used in advanced work. Application of techniques of organic chemistry is made in the laboratory. Prerequisite: Chemistry 646 or registration therein.

**608. Qualitative Organic Analysis. (1-6). Credit 3. I**

Analysis of organic compounds. Prerequisite: Chemistry 228.

**609. Theory of Organic Chemistry. (3-0). Credit 3. II**

The development and application of chemical theories to organic compounds. Prerequisite: Chemistry 646.

**611. Principles of Physical Chemistry. (3-0). Credit 3. I**

A study of the general principles of chemistry from the quantitative standpoint. The course will include a discussion of gases, liquids, and solutions. Prerequisite: Graduate classification.

**620. Principles of Chemical Analysis. (3-0). Credit 3. II**

An advanced survey of the principles of chemical analysis with special emphasis on the newer developments in the field of analytical chemistry. Prerequisite: Chemistry 317.

**621. Chemical Kinetics. (3-0). Credit 3. I**

Study of some of the present theories about chemical reaction rates and mechanisms. Prerequisite: Chemistry 324.

**624. Physico-Organic Chemistry. (3-0). Credit 3. II**

Mathematical and quantitative investigation of organic chemical phenomena. Prerequisite: Chemistry 609 or approval of instructor.

**625. Petroleum Chemistry. (3-0). Credit 3. II**

Practical and theoretical consideration of chemical reactions of petroleum hydrocarbons. Prerequisites: Chemistry 228, 324. (Offered in 1961-62 and in alternate years thereafter.)

**626. Thermodynamics. (3-0). Credit 3. I**

Theory and applications of classical thermodynamic functions. Prerequisite: Chemistry 324.

**628. The Non-Metallic Elements. (3-0). Credit 3. I**

Study of the non-metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**630. The Metallic Elements. (3-0). Credit 3. I**

Study of the metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**631. Statistical Thermodynamics. (3-0). Credit 3. II**

An introduction to the methods of statistical mechanics based primarily on Boltzmann statistics. The approach to thermodynamics through the partition function. The statistical concept of entropy. Prerequisite: Chemistry 626.

**635. Heterocyclic Compounds. (3-0). Credit 3. I**

Structure, preparation, and properties of heterocyclic compounds with special emphasis on those with biological activity. Prerequisite: Chemistry 228. (Offered in 1962-63 and in alternate years thereafter.)

**636. Electrochemistry. (3-0). Credit 3. II**

Advanced treatment of conductivity, electrochemical thermodynamics, galvanic cells, electrodeposition, and corrosion. Prerequisite: Chemistry 324.

**639. Instrumental Methods of Analysis. (2-3). Credit 3. I**

A study of the theory and practice of modern techniques of chemical analysis and research. The laboratory work will illustrate the use of these instruments for routine analytical work and also their use as research tools. Prerequisite: Chemistry 317.

**641. Structural Inorganic Chemistry. (3-0). Credit 3. I**

Study of nuclear and extranuclear structure, isotopes, valency of the elements, and sterochemistry of inorganic compounds. Prerequisites: Chemistry 324, 462.

**642. Methods of Structural Chemistry. (3-0). Credit 3. II**

A study of theory, methods, and application of structural determination (arrangement and bonding) of chemical species. Prerequisite: Chemistry 641 or approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

**643. Inorganic Complex Compounds. (3-0). Credit 3. II**

History, theories, and methods of investigations of inorganic complex compounds. Prerequisites: Chemistry 324, 462. (Offered in 1962-63 and in alternate years thereafter.)

**644. Quantitative Organic Analysis. (1-6). Credit 3. I**

Determinations: Macro Dumas, sulfur, Carius halogen, Micro residue, fractionation, Micro Dumas, catalytic hydrogenation, carbon and hydrogen, Micro Kjeldahl, Rast molecular weight, molar refraction, active hydrogen, alkaxyl, semi-micro saponification number. Prerequisites: Chemistry 228; reading knowledge of German.

**646. Organic Chemistry. (3-0). Credit 3. I**

A systematic and thorough presentation of organic chemistry on an advanced level. Prerequisite: Chemistry 228.

**648. Principles of Quantum Mechanics. (3-0). Credit 3. I**

A brief review of classical mechanics and the development of wave mechanics. The application of wave mechanics to some special chemical problems. Prerequisite: Approval of the instructor.

**661. Radiochemistry. (3-0). Credit 3. II**

A general course dealing with radioactive materials; their radiations; their preparation, purification, detection, identification, and their practical applications. Material on nuclear structures, nuclear transmutations, and radioactivity. Prerequisite: Chemistry 324 or 344.

**685. Problems. Credit 1 to 6. I, II, S**

This is a course in special topics to suit small group requirements. The work will deal with the more recent problems and results in the various branches of chemistry. It may be laboratory work or conference and discussion. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Civil Engineering

Professor S. R. Wright,
Professors J. B. Baty, F. J. Benson, S. J. Buchanan, B. M. Gallaway, E. L. Harrington, R. M. Holcomb*, T. R. Jones, Jr., C. J. Keese, J. A. Orr, C. H. Samson, J. H. Sorrels, H. K. Stephenson, R. N. Traxler; Associate Professors R. E. Schiller, Jr., C. L. Seward, F. M. Smith; Assistant Professors D. G. Capelle, D. E. Cleveland, W. A. Dunlap, H. E. Fairbanks, T. J. Hirsch, R. A. Jimenez, W. R. McCasland**, R. M. Olson, Charles Pinnell***, N. J. Rowan, E. P. Segner, Jr.; Instructors B. D. Franklin, R. P. Shubinski****

**201. Plane Surveying. (3-3). Credit 4. I, II**

Measurement of distances; use and care of surveying equipment; measurement of angles; land surveys and computations; stadia and plane table surveys; route surveys; horizontal and vertical curves; earthwork computations. Prerequisite: Mathematics 103.

**206. Plane Surveying. (0-3). Credit 1. I, II**

Fundamental principles of surveying; use of transit and level; boundary surveys, area computations, profile surveys. Prerequisite: Mathematics 103.

**208. Topographic Surveying. (1-3). Credit 2. I, II**

Fundamental principles of surveying; use of transit and level; special emphasis placed on use of plane table in topographic mapping. Prerequisite: Mathematics 103.

**300. Summer Surveying Practice. Credit 5. S**

Six weeks of surveying practice. Horizontal and vertical control; base line measurements; transit-stadia surveys; plane table surveys; boundary surveys; area and coordinate computation; polaris and solar observations; route surveys. Stream gauging. Prerequisite: Civil Engineering 201.

**305. Mechanics of Materials. (3-0). Credit 3. I, II, S**

Axial stresses and strains; stresses on various planes; properties of materials; stresses in thin-walled cylinders; torsional and flexural stresses and strains; shear and moment diagrams; equation of the elastic curve; moment area theorems; combined loadings; column behavior. Prerequisites: Mathematics 122 or 210; Mechanical Engineering 212 or the equivalent.

**306. Mechanics of Materials. (2-0). Credit 2. I, II, S**

Principal stress and strain relationships including graphical as well as analytical solutions; theories of failures; riveted and welded joints; applications of moment area method; moment distribution method of analyzing statically indeterminate structures. Prerequisite: Civil Engineering 305.

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*On leave of absence from 6-1-61 to 8-31-63.
**On leave of absence from 9-1-61 to 8-31-62.
***On leave of absence from 9-1-61 to 7-1-62.
****On leave of absence from 9-1-61 to 5-1-62.

**311. Hydraulics. (3-0). Credit 3. I, II**

The laws governing the action of water at rest and in motion, as related to engineering problems; the flow of water in pressure mains, sewers, aqueducts, open channels, and in rivers; measurement of the flow of water by nozzle, orifices, weirs and meters; flow of viscous fluids. Prerequisite: Mechanical Engineering 212 or equivalent.

**315. Strength of Materials Laboratory. (0-2). Credit 1. I, II**

Determination of the strength, ductility, modulus of elasticity, and other properties of engineering materials. Tests of timber, steel, cast iron, concrete, and reports showing results. Prerequisite: Civil Engineering 305 or registration therein.

**336. Hydraulics Laboratory. (0-2). Credit 1. I, II**

Calibration of nozzles, orifices, water meters, weirs, pressure gauges; measurement of pipe friction; measurement of pipe flow with pitot instrument and Venturi meter; efficiency tests on impulse motor, hydraulic ram, and centrifugal pump; solution of assigned problems. Prerequisite: Civil Engineering 311 or registration therein.

**338. Hydraulics of Drainage Structures. (2-0). Credit 2. I, II**

The elementary study of rainfall and run-off and the hydraulics of culverts and drainage structures; flow in open channels. Prerequisite: Civil Engineering 311.

**344. Reinforced Concrete Structures. (3-3). Credit 4. I, II, S**

Properties of concrete; plain concrete structures; theory of stress distribution in reinforced concrete in bending, shear, bond, and anchorage; design of typical beams, slabs, and walls; stress distribution in spiral and tied columns with axial and eccentric loading; design of typical columns; interpretation of typical current specifications and use of available tables and charts; economic factors. Prerequisites: Civil Engineering 306, 345.

**345. Theory of Structures. (2-3). Credit 3. I, II, S**

An introduction to structural engineering; loads, reactions, and structural force systems; algebraic and graphical computations of reactions, and forces in beams, three-hinged arches, and trussed structures used as roofs, floor systems, and bridges; influence lines and criteria for moving loads; analysis of indeterminate structures by the general deflection procedure; reactions and forces in bents. Prerequisite: Civil Engineering 306 or registration therein.

**346. Design of Members and Connections. (2-3). Credit 3. I, II, S**

The design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisites: Civil Engineering 306, 345.

**401. Water and Sewage Treatment. (2-2). Credit 3. I, II, S** †

Principles and methods of water purification and sewage treatment and disposal; laboratory demonstrations of control tests and correlation of results with treatment plant operation; interpretation of reports; inspections of local plants. Prerequisites: Chemistry 102 or 104; Civil Engineering 311.

**402. Water Supply and Sewerage Practice. (2-2). Credit 3. I, II** †

Development of sources of water supply; determination of the quantity of storm water and domestic sewage; short problems relating to water supply distribution systems, sewer systems, and the general features of water purification and sewage treatment plants; appurtenances and treatment plant equipment; local inspections of water supply and sewerage systems. Prerequisites: Civil Engineering 338, 401.

**403. Sanitary Design. (2-3). Credit 3. II** †

Practical problems in the design of sewer systems and appurtenances; sewage treatment plants; water collection and distribution systems; water purification plants. Prerequisite: Civil Engineering 402 or registration therein.

**406. Sanitation and Public Health. (3-0). Credit 3. I** †

Relation of sanitation to public health; residential water supply and excreta disposal methods; municipal sanitary work, including refuse disposal; plumbing; control of food supplies; mosquito, fly and rodent control; sanitation of swimming pools; industrial hygiene; orgaanization of health departments. Prerequisite: Junior classification.

**407. Highway Engineering. (3-0). Credit 3. I, II, S** †

An introduction to problems in location, design, drainage, construction, and maintenance of highways, streets, and pavements. Road laws, finances, highway organizations and supervision briefly considered. The text is supplemented by lectures, the use of bulletins, models, and samples of materials. Prerequisites: Civil Engineering 300, 338, 465 or registration therein.

**408. Municipal Administration. (3-0). Credit 3. I** †

City government, including the city manager plan; relation of city to state; administration of city departments; public utilities; city planning. Prerequisite: Junior classification.

**417. Bituminous Materials. (2-3). Credit 3. II** †

Origin, production, specifications, and tests of bituminous materials and mixtures used in the construction and maintenance of roads and pavements. Prerequisites: Senior classification in engineering and Civil Engineering 407 or registration therein.

**435. Soil Engineering. (2-3). Credit 3. I**

Problems encountered in the design and construction of earth dams and coffer dams; design of footings, drilled piers, and pile substructures; design and construction of embankments and subgrades for roads and airfields; seepage through earth masses. Prerequisites: Civil Engineering 465; senior classification.

**443. Materials of Construction. (1-3).* Credit 2.* I, II,** †

Laboratory tests, supplemented with theory, of aggregates, cement, concrete mixtures, and masonry materials. Prerequisite: Senior classification.

**448. Engineering Economy. (2-0). Credit 2. I, II** †

Analysis of operating costs of engineering projects including interest, depreciation, fixed costs, overhead. Comparison of first cost economy versus ultimate economy. Prerequisite: Junior classification in engineering.

**456 Highway Design. (2-3). Credit 3. II**

Theory and practice in highway design. Highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements. Prerequisite: Civil Engineering 407.

**457. Traffic Engineering. (3-0). Credit 3. I, S** †

A study of vehicle operating characteristics, traffic flow, geometric design of roads, streets, and intersections, and methods of traffic control. Prerequisites: Civil Engineering 201, 407 or registration therein; Physics 219.

**458. Hydraulic Engineering. (3-0). Credit 3. II** †

Flow in pipes and complex pipe systems; non-uniform flow in open channels; pumping machinery; elementary hydraulic model theory. Prerequisite: Civil Engineering 338.

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*Becomes (2-3), credit 3, effective September 1, 1965.

**463. Hydrology. (3-0). Credit 3. I** †

A study of the occurrences and measurements of precipitation and stream flow, relations between precipitation and run-off; estimating seepage; evaporation, run-off; surface, and flood discharges for drainage basins. Prerequisite: Civil Engineering 311.

**465. Soil Mechanics and Foundations. (2-2). Credit 3. I, II, S** †

An elementary introduction to soil mechanics and its application to the usual problems encountered in civil and architectural engineering. The origin, formation processes, and types of soils are reviewed. Methods of exploration and soil testing required for the design of various types of foundations, retaining walls, bridge abutments, coffer dams, earth dams, and other engineering structures. Prerequisites: Civil Engineering 305; Geology 320 or 422.

**470. Aerial Photogrammetry. (2-3). Credit 3. II** †

A study of photogrammetric optics, characteristics of aerial photographs, aerial cameras, map projections, ground control, radial plots, mosaics, interpretation of aerial photographs, stereoscopic plotting instruments, and mapping from oblique photographs. Prerequisite: Civil Engineering 201.

**473. Cost Estimating. (3-0). Credit 3. I, II, S** †

Approximate and detailed estimates of the cost of construction projects including earthwork, foundations, concrete, masonry, steel, and miscellaneous items. Costs are developed to include materials, equipment, labor, overhead, and profit. Prerequisite: Senior classification.

**478. Construction Plant and Methods. (3-0). Credit 3. I, II** †

Plant and equipment selection for earthwork, foundations, concrete and structural steel, based on performance and economy. Construction schedules, progress reports, and performance records. Prerequisite: Senior classification in engineering or architecture.

**481. Seminar. (1-0). Credit 1. I, II** †

A study of the methods of job procurement subsequent to graduation including letters of application and job interviews; responsibilities and obligations of the young civil engineer; professional ethics; membership in professional societies, professional registration; lectures by staff and practicing engineers. Prerequisite: Senior classification.

**483. Analysis and Design of Structures. (2-3). Credit 3. I, II** †

The over-all procedure of analysis and design, including functions, loads, layouts of force systems, analysis, design drafting, specifications, cost comparisons, and maintenance as applied to typical simple bridge and building structures, design of plate girders, trusses, and reinforced concrete buildings. Prerequisites: Civil Engineering 344, 346, 465.

**486. Design of Prestressed Concrete Structures. (2-3). Credit 3. II** †

Basic theory. Properties of materials used. Stress losses. Prestressing systems. Design of determinate beams for flexure, shear, bond, and bearing. Deflections. Design of slabs and of continuous beams. Circular prestressing. Tension and compression members. Connections. Current specifications and economics of design. Prerequisite: Civil Engineering 483.

**Structural Mechanics 468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

See Structural Mechanics for a full description of this course.

**Structural Mechanics 469. Analysis of Structures. (2-3). Credit 3. II** †

See Structural Mechanics for a full description of this course.

## FOR GRADUATES

**601, 602. City Management. (4-0). Credit 4 each semester. I, II**

Development of European and American cities; forms of city government; functions of the city manager; administration of municipal affairs; organization of city departments; city finances; public utilities, fire prevention and protection, police administration; parks and playgrounds; public health and welfare; housing; city planning.

**603. Sewage Treatment and Stream Sanitation. (4-0). Credit 4. I**

Advanced studies of the theories of the various processes of sewage treatment, with special attention given to the details of the individual methods and units employed to effect these processes; and the requirements regarding the qaulity of sewage treatment plant effluents in relation to the sanitary protection of the receiving waters. Prerequisite: Civil Engineering 402.

**604. Water Quality and Treatment. (4-0). Credit 4. II**

Advanced studies of the characteristics of available sources of water, standards of quality of public water supplies, and the theories of treatment and purification processes, with special attention given to the details of the methods and units employed to effect these processes. Prerequisite: Civil Engineering 402.

**607, 608. Environmental Sanitation. (4-0). Credit 4 each semester. I, II**

Detailed study of environment and its relation to disease, covering malaria and its control; rodent control; sanitation of milk, shellfish, and other foods; collection and disposal of municipal refuse; sanitary aspects of air conditioning; housing sanitation, including plumbing and ratproofing; rural water supply and excreta disposal; sanitary inspection procedure.

**610. Industrial Wastes. (4-0). Credit 4. II**

Amount and characteristics of the common industrial wastes; their effects upon sewage treatment; methods of treatment. Prerequisite: Civil Engineering 401 or the equivalent.

**612. Transportation in City Planning. (2-0). Credit 2. I, S**

The importance and place of transportation in urban development and planning. The role of the engineer in planning. The relationship of transportation to planning studies, land use, zoning, planning legislation, and administration. Prerequisite: Graduate classification in the School of Engineering.

**615. Structural Design of Flexible Pavements. (2-0). Credit 2. I**

Characteristics of pavement loads, stress analysis in flexible pavements, design practices, construction and maintenance. Prerequisite: Civil Engineering 407.

**617. Traffic Engineering: Characteristics. (2-3). Credit 3. I**

Advanced theory and practice of engineering studies of traffic characteristics. Methods of traffic administration. Prerequisite: Civil Engineering 457.

**618. Traffic Engineering: Operations. (2-3). Credit 3. II**

Advanced theory and application of traffic control and design of traffic facilities. Traffic regulations. Prerequisites: Civil Engineering 457, 617.

**619. Highway Problems Analysis. (2-3). Credit 3. II**

The theory and application of advanced techniques in statistics, aerial photogrammetry, and data processing in the solution of problems in highway and traffic design and research. Students should have knowledge of computer programming and basic statistics. Prerequisite: Approval of the Head of the Department.

**620. Structural Design of Rigid Pavements. (2-0). Credit 2. II**

Theory of rigid pavement design, design practices, maintenance, and construction. Prerequisite: Civil Engineering 407.

**621. Advanced Reinforced Concrete Design. (3-3). Credit 4. II**

Creep, shrinkage, and temperature change effects in concrete. Deflections in reinforced concrete members. Combined bending and axial loads. Deep beams. Torsion in concrete members. Ultimate strength design methods. Retaining walls, rectangular tanks, circular tanks, and deep bins. Flat slab floor systems and bridges. Domes. Prerequisite: Civil Engineering 483.

**622. Hydraulics of Drainage Structures. (2-3). Credit 3. II**

Hydraulics of open channels, bridge openings, culverts, head walls, surface street drainage, storm sewers, gutters, drop inlets and spillways. Theory of model studies as applied to drainage of highways, streets, and freeways. Prerequisite: Civil Engineering 338 or the equivalent.

**625. Geometric Design of Highways. (3-3). Credit 4. I**

The advanced theory and practice in highway design. Design controls and criteria, elements of design, design of alignment, cross-section, intersections and interchanges, multilane expressways, and drainage structures. Prerequisites: Civil Engineering 407, 465.

**627. Hydraulic Engineering. (3-3). Credit 4. I**

A study of precipitation, steam gaging methods, evaporation and transpiration, groundwater, hydrograph analysis, flood hydrographs from rainfall and snow, snow melt. Stream flow routing, frequency and duration. Studies, sedimentation, storage reservoir design, graphical correlation, airfield drainage.

**628. Hydraulic Engineering. (3-3). Credit 4. II**

A study of boundary layer theory, fluid flow in pipes, complex pipe networks, dimensional analysis, similitude and models, gradually and rapidly varied flow in open channels, backwater curves in natural streams, stilling basin design problems.

**629. Hydraulics of Open Channels. (3-3). Credit 4. I**

Advanced problems in uniform and non-uniform flow in open channels; the hydraulic jump; control section; backwater profiles.

**630. Ground Water Hydrology. (1-3). Credit 2. II**

A quantitative study of the application of the principles of hydrology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent, registration in 625.

**632. Advanced Design in Metals. (2-3). Credit 3. II**

Properties of high-strength and other special materials. Stress concentrations and fatigue. Ultimate strength. Reconsideration of selected specification rules in the light of theory, tests and new developments. Characteristics of thin gauge structures. Design of complex members and connections such as: curved columns, fixed bases, and rigid-frame knees. Prerequisites: Civil Engineering 483; Structural Mechanics 468.

**633. Advanced Mechanics of Materials. (4-0). Credit 4. I**

Principal stresses and theories of failure of elastic action; stress concentrations; unsymmetrical bending; mechanical methods for study of internal stresses; thick-walled cylinders; torsion in non-circular cross sections; special problems such as bending in flat plates, buckling of webs, and bending in curved beams and hooks. Prerequisite: Civil Engineering 306.

**634. Airfield Planning and Design. (2-0). Credit 2. II**

Study of regional planning, air traffic routing, landing requirements, methods for development of master plans for site selection, airfield design requirements involving layouts, pavement selection, and design. Review and application of criteria of design of drainage for all types of fields.

**636. City Street Design. (2-0). Credit 2. S**

Street classification and function. Design of city streets, intersections, access drives, and pavements. Street drainage. Financing city street improvements. Prerequisite: Civil Engineering 407.

**640. Freeway Design and Operation. (2-0). Credit 2. S**

Characteristics of traffic flow on controlled access facilities. Advanced theory and practice in operation on freeways and related street systems. Freeway traffic control. Material based on advanced research of the Texas Transportation Institute. Prerequisite: Civil Engineering 618.

**643. Plastic Analysis and Design in Steel. (2-3). Credit 3. I, S**

Principles and methods that are the basis for plastic analysis and design of steel frames. Static and mechanism methods of analysis of structures for ultimate load. Influence of shear and axial forces on plastic design. Effect of lateral buckling. Design of connections to provide plastic action. Design guides and specifications. Prerequisite: Graduate classification in civil engineering or approval of the instructor.

**649. Soil Mechanics. (3-3). Credit 4. I**

A study of foundation materials as they exist and of the various types of soils, their physical properties, testing procedure, and principles of classification. For advanced undergraduates and for graduate electives. Prerequisites: Civil Engineering 465; Geology 320.

**650. Soil Mechanics. (3-3). Credit 4. II**

A study of theory and practice in foundation explorations, laboratory investigations of undisturbed foundation samples, stress distribution through soils; problems in foundation design, correlation of settlement data from actual observations on the behavior of existing structures, stability of embankments, backfill pressures. Prerequisite: Civil Engineering 649.

**651. Advanced Theory and Application of Soil Mechanics. (3-3). Credit 4. I**

Special lectures, discussions and applications of theory to solution of major problems encountered in practice of soil engineering, embracing the fields of seepage, earth work design, foundation design, port structures, and special problems. Prerequisite: Civil Engineering 650.

**653. Flexible Materials of Construction. (2-3). Credit 3. I**

Theory supplemented with laboratory tests of bitumen, tars, and plastics. Stabilization of base and subgrade materials. Advanced mix design and evaluation of test methods; rheology and chemistry of asphalt. Prerequisite: Civil Engineering 417.

**654. Rigid Materials of Construction. (2-3). Credit 3. II**

A study of physical and chemical properties of rigid materials of construction; laboratory tests of different kinds of concrete, tests of metals and laminates; theory of corrosion of ferrous metal; corrosion mitigation; shrinkage and plastic flow of stressed concrete; design of concrete mixtures for resistance to alkali reactive aggregates, blasts from jet planes, salt water, and cavitation in hydraulic works. Prerequisite: Civil Engineering 443.

**656. Concrete Structures Testing Laboratory. (1-3). Credit 2. II**

Methods and equipment used in testing reinforced concrete structures and elements of structures. Planning of tests, and testing of various beams and columns. Observations of behavior in compression, flexure, shear, torsion, and combinations thereof. Correlations with theory, both elastic and plastic. Prerequisite: Civil Engineering 621.

**657. Dynamic Loads and Structural Behavior. (3-3). Credit 4. I**

The forces resulting from wind, other moving fluids, earthquakes, blasts, impact, moving loads, and machinery. The dynamic behavior of various structures and structural elements under the action of such loads. Self-induced vibration. Design to minimize and resist such forces. Prerequisites: Civil Engineering 483; Mechanical Engineering 459; Structural Mechanics 468.

**659. Structural Design. (3-3). Credit 4. II**

General theory and design procedures for thin-shell and folded-plate structures. Characteristics, use, construction, problems, and economic factors. Membrane theory for shells. Edge effects and effects of unsymmetrical loading. Design procedure for long, shallow, folded-plate structures. Approximate procedure for short, deep, folded-plate structures. Other special design problems. Prerequisite: Structural Mechanics 469 or the equivalent.

**666. Foundation Structures. (2-3). Credit 3. II**

The structural analysis and design of foundations. Spread footings, combined footings, and raft foundations. Retaining walls, piles, and pile foundations. Sheet-pile structures, cofferdams, wharves, and piers. Bridge piers and abutments. Prerequisites: Civil Engineering 465 or the equivalent; graduate classification in civil engineering.

**667. Highway Structures. (3-3). Credit 4. I**

The structural analysis and design of bridges, grade separation structures, retaining walls, and culverts. Review of functional and aesthetic requirements. Loads, materials, comparisons of different types, and economic proportions. Current standard, new developments, and current cost information. Prerequisites: Civil Engineering 483, 625.

**669. Bituminous Technology. (2-0). Credit 2. I, II**

A review will be made of the methods and techniques used in evaluating the chemical, physical, colloidal and rheological properties of asphaltic materials. The available data will be discussed and a study made of the methods for evaluating durability of asphalt. The original literature will be used for assigned reading. Prerequisite: Civil Engineering 417.

**670. Bituminous Technology. (2-0). Credit 2. I, II**

A study will be made of procedures used in selecting and processing crude oil for the manufacture of asphalt. The fundamental properties of asphaltic cutbacks, asphalt emulsions and mineral filled bitumens will be reviewed. The requirements of asphalts for use in roads, roofing and special applications will be studied. Original source material will be used. Prerequisites: Civil Engineering 417, 669.

**671. Urban Transportation Planning. (2-0). Credit 2. S**

The urban transportation problem. Techniques of estimating demand for traffic facilities. Special studies required in transportation planning. Prerequisites: Civil Engineering 617, 618.

**672. Urban Transportation Planning. (2-0). Credit 2. S**

Problems of mass transportation. Study of the central business district, suburban shopping centers and terminal planning. Street and subdivision transportation system planning. Urban transportation economics, financing, and administration. Prerequisite: Civil Engineering 671.

**681. Seminar. (0-2). Credit 1. I, II, S**

Reports and discussion of current research and of selected published technical articles. May not be taken for credit more than once in a Master's degree program and twice in a Ph.D. program. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

A course offered to enable majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by other courses in the established curriculum. Credit for this course normally will be limited to four credits per semester, but in exceptional circumstances, the Head of the Department may approve a maximum of six credits in one semester or summer term.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. II, S**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**

See Structural Mechanics for a full description of this course.

## Department of Dairy Science

Professor I. W. Rupel,
Professors R. E. Leighton*, A. V. Moore; Associate Professors I. I. Peters, Carl Vanderzant; Assistant Professor M. A. Brown

**202. Dairying. (2-2). Credit 3. I, II**

A survey of the dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance.

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*On leave of absence from 9-1-61 to 8-31-63.

Food value of milk, tests for composition and quality, utilization and processing of market milk and dairy products. Prerequisite: Chemistry 101 or 103.

**301. Market Milk. (3-2). Credit 4. I** †

Nutritional value of milk; milk and public health; organization of city milk supplies; processing, distribution, and inspection of market milk. Prerequisites: Biology 206; Dairy Science 202.

**303. Dairy Cattle Judging. (0-3). Credit 1. I**

Comparative judging of dairy cattle. Economic value of dairy type. Student contests and commercial judging techniques. Prerequisite: Dairy Science 202.

**307. Judging Dairy Products. (0-2). Credit 1. II**

Practice in judging and scoring dairy products according to consumer preference, established student contest, and commercial standards. Prerequisite: Dairy Science 202 or approval of the instructor.

**310. Advanced Dairy Cattle Judging. (0-2). Credit 1. II**

Advanced dairy cattle judging with particular attention to show ring type and breed registry association classification. Prerequisite: Dairy Science 303.

**311. Technical Control of Dairy Products. (2-6). Credit 4. II** †

Methods of analysis of milk and milk products, and their use in controlling the composition and quality of dairy products. Prerequisites: Chemistry 223, 231; Dairy Science 301.

**316. Butter and Cheese Manufacture. (3-4). Credit 4. II** †

Processing procedures in the commercial manufacture of domestic and foreign cheeses; creamery butter manufacture. Prerequisites: Dairy Science 301, 320. (Offered in 1962-63 and in alternate years thereafter.)

**320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

Relation of microorganisms to quality in milk and milk products; starter and fermented milk culture management; sanitary control on farms and in commercial dairies; standard analytical procedures according to the American Public Health Association. Prerequisite: Biology 206.

**324. Commercial Dairy Products. (3-0). Credit 3. II**

A modification of Dairy Science 316, 407, 415. Prerequisite: Dairy Science 202. (Offered in 1961-62 and in alternate years thereafter.)

**326. Food Bacteriology. (3-3). Credit 4. II** †

The microbiology of human foods and accessory substances. A study of raw and processed foods, emphasizing the physical, chemical, and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: Biology 206.

**407. Ice Cream Manufacturing. (2-3). Credit 3. II** †

The manufacture of ice cream, sherbets, and ices, and the physical and chemical principles involved; ice cream plant equipment; flavoring materials; merchandising. Prerequisite: Agricultural Engineering 213; Dairy Science 202.

**410. Dairy Plant Management. (1-2). Credit 2. II** †

Dairy plant operating efficiency. Special economy problems related to the handling of fluid milk, butter, cheese, and concentrated dairy products. Prerequisite: Senior classification in dairy science.

**415. Condensed and Powdered Milk. (2-2). Credit 3. I** †

The manufacture and distribution of condensed and evaporated milk, milk powder, milk sugar, casein, and other milk products. Prerequisites: Chemistry 231 or equivalent; Dairy Science 301; one semester of physics.

**416. Milk Secretion and Milking. (1-2). Credit 2. I**

The physiology of lactation and the relationship between mechanical milking and the health and function of the bovine mammary gland. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 410; Biology 206.

**417. History and Development of Dairy Cattle. (2-2). Credit 3. I** †

The breeding and development of a dairy herd, including artificial breeding, selection of breeding animals, production testing and type classification, breeding programs, herd analysis, and a review of the development of the breeds. Prerequisites: Dairy Science 202; Genetics 301.

**418. Feeding and Management of Dairy Cattle. (3-2). Credit 4. II** †

The feeding, care, and management of the dairy herd; calf raising, developing the dairy heifer, care of dry and fresh cows, feeding for milk production, disease control, silage, buildings, anad related topics. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 401; Dairy Science 202.

**420. Dairy Management. (1-2). Credit 2. II**

Feeding, care and management of dairy cattle, including herd improvement through breed selection, feeding for milk production, development of replacement stock and disease control. For agricultural education majors only. Prerequisites: Animal Husbandry 303; Dairy Science 202; Genetics 301.

**481. Seminar. (1-0). Credit 1. I, II** †

A review of current dairy literature and presentation of papers on selected dairy topics. May be elected a second time for one additional credit. Prerequisite: Senior classification.

**485. Special Problems. Credit 1 to 4. I, II** †

Special problems in dairy production or dairy manufactures. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**601, 602. Dairy Production. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy production, feeding, breeding, and management. Prerequisite: Dairy Science 418.

**603, 604. Dairy Manufactures. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy manufactures. Prerequisites: Dairy Science 316, 407, 415.

**609. Dairy Cattle Breeding and Management. (3-0). Credit 3. S**

Advancements in dairy cattle feeding, breeding, management, and commercial milk production. A three-week course for agricultural workers offered in summer sessions only. Not open to dairy science majors. Prerequisite: Dairy Science 418 or 420 or approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A study of research methods and a review of scientific literature dealing with individually selected problems in production or manufactures and not pertaining to thesis or dissertation. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research leading to thesis or dissertation in the respective fields of dairy production and dairy manufactures. Prerequisite: Graduate classification.

## Department of Economics

Professor A. F. Chalk,
Professor E. E. Liebhafsky; Associate Professors I. O. Linger, H. R. Putnam;
Assistant Professors C. A. Bitner, Jr., M. H. Butler, L. H. Stern, J. J. Treacy

**203. Principles of Economics. (3-0). Credit 3. I, II, S**

An introductory survey course designed to acquaint the student with elementary principles of economics; the economic problem, the measurement and determination of national income, money and banking, and the theory of price. Prerequisite: Sophomore classification.

**204. Principles of Economics. (3-0). Credit 3. I, II, S**

A second course in elementary economics with primary emphasis upon analysis of economic aggregates, the theory of production and of the firm, international economic relations and labor problems. Prerequisite: Economics 203.

**311. Money and Banking. (3-0). Credit 3. I, II, S**

The fundamental principles of money, credit, and banking and their exemplification in modern currency and banking history, particularly that of the United States. Special attention is given to present-day conditions and problems. Prerequisite: Economics 203.

**318. Economics of Labor. (3-0). Credit 3. I, II, S**

Special attention is given to the labor force, unemployment, labor markets, wages, work periods, the aged worker, industrial accidents, and phases of social security. Prerequisites: Economics 203, 204.

**319. Economic Development of the United States. (3-0). Credit 3. II**

A survey of the economic development of the United States from colonial times to the present. The course will describe the origin and development of our economic and social institutions and provide a basis for an understanding of our present economic problems. Prerequisite: Economics 203.

**320. Economic Development of Europe. (3-0). Credit 3. II**

A survey of the steps by which economic activities have evolved from the Medieval period into the complex capitalistic economy of today. Special emphasis on the development of the wage system, the Industrial Revolution, the expansion of markets, the ebb and flow of industrial activities, the financial structure, and the relation of industrial development to political policy. Prerequisite: Economics 203.

**321. International Trade and Finance. (3-0). Credit 3. I** †

A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisite: Economics 203.

**323. Economic Analysis. (3-0). Credit 3. I** †

The importance of prices in directing production and distributing income under both competitive and monopolistic market situations is considered, along with a survey of the effects of governmental policies on the pricing system. Prerequisites: Economics 203, 204.

**324. Comparative Economic Systems. (3-0). Credit 3. I**

A study of the economic systems of the leading nations. Prerequisite: Economics 203.

**330. Economic Development. (3-0). Credit 3. II**

Basic concepts and problems of economic development in underdeveloped countries. This course is designed for (1) foreign students, (2) students in technical programs planning for careers in foreign service, and (3) in-service training for technical assistance personnel. Prerequisite: Approval of Head of Department.

**410. Theory of Income and Employment. (3-0). Credit 3. I** †

Primary emphasis is given to the following topics: (1) conceptual problems of measuring national income; (2) organization of the national income accounts of the United States; and (3) determinants of the aggregate levels of income, employment, and prices. Prerequisites: Economics 203, 204, 311.

**412. Public Finance. (3-0). Credit 3. II** †

A survey of financial practices at the federal, state, and local levels of government. Current public problems and the theory of public finance are analyzed with the objective of determining appropriate changes in expenditure, tax, debt, and budget policies. Prerequisites: Economics 203, 204.

**424. Economics of Transportation. (3-0). Credit 3. II**

A description of the structure and functioning of our highway, rail, water, and air transportation systems; the economic significance of transportation in our society; and an analysis of the theory and practice of regulation of the transportation industries by the Interstate Commerce Commission and other governmental agencies. Prerequisite: Economics 203.

**435. Economics of Collective Bargaining. (3-0). Credit 3. I.** †

Analysis of collective bargaining as an evolutionary process and the effect of negotiated wages and supplementary benefits upon labor mobility, productivity, managerial efficiency, and the economy as a whole. Prerequisite: Economics 318 or approval of the Head of the Department.

**437. Government and Labor Relations. (2-0). Credit 2. II** †

A study of court decisions and laws regulating and protecting labor in the interest of national welfare with attention given to the social and economic environment in which such regulations were developed. Special attention is given to the major legislative acts of Congress and some of the state laws pertaining to labor relations, with some attempt to evaluate these in the light of a changing conception of labor relations. Prerequisite: Economics 318 or approval of the Head of the Department.

**443. Contemporary Economic Problems. (3-0). Credit 3. II** †

A study of current economic problems which lie within the following major areas of economic policy: economic stability, control of monopoly power, distribution of income, and international economic relations. Prerequisites: Economics 203, 204.

**481. Seminar. (1-0). Credit 1. II** †

Primarily for students majoring or minoring in economics. A study of methodology, scope, and philosophy of economic science, followed by individual investigation of some current economic problems. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. History of Economic Thought. (4-0). Credit 4. I**

Primary emphasis is given to the classical period of 1776-1848, although a brief survey of pre-classical economic thought is made at the beginning of the course. Students are expected to read extensively in original sources, and special attention is devoted to the works of Smith, Malthus, West, Ricardo, and Mill. Prerequisite: Approval of the Head of the Department.

**602. History of Economic Thought. (4-0). Credit 4. II**
Following a general survey of the wage-fund controversy, an intensive study is made of marginal utility theory as developed by Menger, Jevons, Boehm Bawerk, etc., followed by the neo-classical period. The final portion of the course is devoted to the synthesis of classical and marginal utility theory found in Marshall's system. Prerequisite: Approval of the Head of the Department.

**606. Economics of Labor. (4-0). Credit 4. II**
A survey of theories of the labor movement is followed by analysis of wage and employment theories, the effect of union policies and practices upon wages and employment, and the role of unionism in economic stability. Prerequisite: Economics 318.

**607. Contemporary Economic Theory. (4-0). Credit 4. II**
This is a survey of the more important contributions to economic thought which have been made during the last generation. The current writings of important contemporary economists are read and evaluated. Prerequisite: Economics 323.

**611. National Income Analysis. (4-0). Credit 4. I**
This course develops modern static national income analysis from a general equilibrium system. A survey is made of elementary dynamic national income analysis. The roles of fiscal and monetary policy in promoting economic stability are examined. Prerequisite: Economics 410 or approval of the Head of the Department.

**613. International Economic Policies. (3-0). Credit 3. II**
A critical examination of governmental policies toward international trade both at home and abroad; includes study of the role of the individual and the state in foreign trade; examines export and import controls, exchange control and exchange stabilization funds; considers tariff and rehabilitation policies of the government and their relation to foreign trade. Prerequisite: Economics 321.

**685. Problems. Credit 1 to 3 each semester. I, II, S**
Individual problems not related to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in economics; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**
Thesis research.

## Department of Education and Psychology

Associate Professor P. R. Hensarling;
Professors G. P. Parker, D. F. Parry, W. A. Varvel; Associate Professors
M. S. Kavanaugh, S. A. Kerley; Assistant Professors D. G. Barker,
D. M. Estes, L. H. Hope; Instructor R. L. Provost

### EDUCATION

**121. An Introduction to Education. (3-0). Credit 3. I, II**
A survey course in the social foundations of American education.

**321. Secondary School Methods. (3-0). Credit 3. I, S**
Methods of teaching high school subjects; for students who expect to teach in secondary schools.

**421. History and Philosophy of Education. (3-0). Credit 3. I, S** †

An evaluation of the educational achievements of the various nations and people of the western world; the development of the social, religious, political, and cultural beliefs and attitudes that underlie American education today. Prerequisite: Six hours of education.

**425. Supervised Student Teaching. (2-12). Credit 6. I, II**

Observation and participation in classroom activities. Techniques of teaching the student's special subjects. Two hours per week devoted to student's problems. Preparation of units of work preparatory to teaching. Supervised teaching. Prerequisites: Senior classification; approval of the Head of the Department.

**426. Tests and Measurements. (3-0). Credit 3. II, S** †

The development of scientific measurement. The fundamental principles of sound measurement and an intensive study of the methods of appraising achievements of instructional objectives. Primary emphasis upon methods of constructing teacher-made objective tests and techniques for improving other types of written examinations. Prerequisite: Education 321 or the equivalent.

**427. Principles of Guidance. (3-0). Credit 3. I, S** †

Introduction to the field of guidance and student personnel work. Treatment of principles underlying the aims, methods, and instruments employed in counseling and guidance. Attention to relationship of instruction and guidance. Prerequisite: Psychology 301 or a course in general psychology.

**436. Organization and Administration of the Elementary School. (3-0). Credit 3. S** †

The functional study of the participation in, and the organization and administration of the elementary school. Designed to meet the needs of elementary school principals, supervisors, teachers, and school superintendents. Prerequisites: Twelve hours of education.

**437. Organization and Administration of the Secondary School. (3-0). Credit 3. II, S** †

The functional study of the participation in, and the organization and administration of the secondary school. Designed to meet the needs of secondary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education or the equivalent.

**439. Educational Statistics. (3-0). Credit 3. I, S** †

Statistical techniques for classroom teachers, principals, students of psychology and education, and educational research workers. Problems originating in classrooms, offices of principals, laboratories of educational investigators will be used for illustrative materials and exercises. Not open to students who have received credit for any other course in statistics. Prerequisite: Six hours of advanced education.

**443. Elementary School Curriculum. (3-0). Credit 3. S** †

Curriculum problems as they relate to the growth, development, and adjustment of the child in the elementary school. Emphasis given to the study of curriculum materials and to the resource unit approach within the modified elementary curriculum structure. Prerequisite: A previous course in elementary school methods.

**444. Secondary School Curriculum. (3-0). Credit 3. I, S** †

Inquiry into current curriculum practices and their backgrounds, basis for curriculum reorganization, emphasis upon the resource unit approach within the modified curriculum structure. Prerequisite: Education 321 or the equivalent.

## FOR GRADUATES

**601. College Teaching. (2-0). Credit 2. I, S**

Conceptions of higher education underlying typical programs including general education, the learning process, and effective use of techniques and instrumentalities of classroom instruction. Prerequisite: Graduate classification.

**607. Programs and Procedures in Supervision. (3-0). Credit 3. II, S**

Designed for teachers, supervisors, and administrators. Deals with the philosophy, organization, and administration of supervision of both the elementary school and the secondary school. Prerequisites: Education 321, 444 or the equivalent.

**608. Administration of Local School Finance. (3-0). Credit 3. II, S**

A study of school funds on the local school level: sources, budgeting, systems of accounting and reporting. Supply management as related to school efficiency.

**609. Public School Laws. (3-0). Credit 3. I, S**

A review of the constitutional provisions, statute laws, court decisions, and regulations governing the public schools, with special reference to Texas.

**610. Pupil Accounting. (3-0). Credit 3. I**

A study of devices to record and improve census taking and attendance; classification and promotional schemes; school record systems; school reports and pupil appraisal studies; marking systems.

**613. The School Plant. (3-0). Credit 3. II, S**

A study of plans for determining the extent and character of present and future building and equipment needs of a school unit; efficiency of present plant; operation and maintenance; planning the building program.

**615. Structural Organization and Administration. (3-0). Credit 3. I, S**

A study of educational administration in the United States through an analysis of the nature of the educational function, consideration of the implications of democracy, and the legal relations of formal education to the democratic state. Emphasis will be given to the structural organization and administration of state and local school systems. Prerequisites: Education 437; graduate classification.

**616. Administration of Staff Personnel. (3-0). Credit 3. I, S**

A study of selection, salary schedules, tenure, and promotion of teachers, including in-service training; efficiency records and ratings.

**623. Standardized Tests and Measurements. (3-0). Credit 3. I**

Use of standardized tests in instruction and guidance. Study of various tests of achievement, aptitude, interest, and personality. Methods of construction, experimental trial, and standardization of published tests. Interpretation of test results. Prerequisite: Education 426 or 439, or the equivalent.

**624. Individual Testing. (2-3). Credit 3. I, S**

Practicum in administration and interpretation of Stanford-Binet and Wechsler-Bellevue intelligence tests. Introduction to individual tests of personality. Prerequisites: Education 426 or 439; 623 or registration therein.

**625. Practicum in Secondary Education. (2-3). Credit 3. I**

A course designed for secondary school teachers in which a study is made of current problems of the secondary school. The student, with the advice of the instructor, will select an individual problem from the following areas: planning, including the school survey; curriculum development; life adjustment education; education for out-of-school youths and adults; evaluative criteria; counseling; supervision; citizens' committee for the public schools. Prerequisites: Individual approval; teaching experience.

**626. Practicum in Secondary Education. (2-3). Credit 3. II**

This is a continuation of Education 625. The student selects an individual secondary school problem different from the one used for Education 625.

**627. Practicum in Elementary Education. (2-3). Credit 3. I**

A course designed for elementary school teachers in which a study is made of current problems of the elementary school. The student, with the advice of the instructor, will select an individual problem from the following areas: evaluation; a detailed study of testing programs; curriculum development in specific areas; health and safety education; child growth and development; improving teaching techniques; counseling; supervision; school and community programs. Prerequisites: Individual approval; teaching experience.

**628. Practicum in Elementary Education. (2-3). Credit 3. II**

This is a continuation of Education 627. The student selects an individual elementary school problem different from the one used for Education 627.

**629. Practicum in Counseling and Guidance. (2-3). Credit 3. II**

Supervised practice in individual counseling and group guidance. Cases assigned in Counseling and Guidance Center and local public schools. Prerequisites: Education 624, 631.

**631. Techniques of Counseling. (3-0). Credit 3. II**

Methods of gathering, analyzing, and interpreting case data in counseling. Analysis of dynamics of counselor-counselee relationship. Interviewing techniques. Use of test results in counseling. Prerequisites: Education 427 or 635, 623; Psychology 634.

**632. Educational and Occupational Information. (3-0). Credit 3. I, S**

Sources, classification, and analysis of educational and occupational information. Occupational trends, local occupational surveys. The use of occupational information by the classroom teacher and the guidance specialist.

**633. Methods of Group Guidance. (3-0). Credit 3. I, S**

Methods and practices in group guidance. The homeroom, classroom, and school clubs as opportunities for guidance. Prerequisite: Education 427 or 635.

**635. Organization and Administration of Pupil Personnel Services. (3-0). Credit 3. I, S**

A course for administrators, counselors, supervisors, and teachers designed to help them develop an understanding of the role of pupil personnel services; responsibility for the techniques of evaluating the program of pupil personnel services. Prerequisite: Graduate classification.

**637. Advanced Elementary School Methods. (3-0). Credit 3. S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the elementary school level. Prerequisite: Twelve hours in elementary education or an elementary school certificate.

**638. Advanced Secondary School Methods. (3-0). Credit 3. II, S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the secondary school level. Prerequisite: Twelve hours of secondary education or a secondary school certificate.

**639. Processes in Educational Leadership. (3-0). Credit 3. II, S**

An analysis of the skills and techniques of the administrator in the modern school, with emphasis on democratic leadership, teacher-administrator relationships, group processes, and evaluation of the administrative programs. Prerequisite: Twelve hours of advanced education.

**640. School-Community Relationships. (3-0). Credit 3. II, S**

Considers the total educational and social patterns of living which exist in any community. The home, the school, the church, clubs, recreation centers, and all agencies of the community are conceived collectively as dominating educational influences in the life of the child. Prerequisites: Twelve hours of advanced education; graduate classification.

**681. Seminar. (1-0). Credit 1. I, S**

Problems pertinent to the superintendent, principal, counselor, supervisor, and visiting teacher are selected. Recent developments and research in the different areas will be presented. Prerequisites: Eighteen hours of advanced education; approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of education. Prerequisite: Graduate classification in education.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

## PSYCHOLOGY

**207. General Psychology. (3-0). Credit 3. I, II, S**

An introductory course dealing with the elementary principles of human behavior. Designed especially for those students majoring in the social or biological sciences, in pre-medicine, or in education. Credit cannot be obtained for both Psychology 207 and 303.

**301. Educational Psychology. (3-0). Credit 3. I, II, S**

The application of psychology to the problems of teaching. The nature and operation of the laws of learning; transfer of training; nature, measurement, and significance of individual difference; conditions that influence efficiency of learning.

**303. Psychology for Technical Students. (3-0). Credit 3. I, II, S**

An introductory course emphasizing the applications of general psychology. Designed for students of agriculture, business administration, and engineering. Credit cannot be obtained for both Psychology 207 and 303.

**305. Personality Adjustments. (3-0). Credit 3. I**

Emphasis upon adjustment problems of normal people. Principles of mental hygiene in relation to family, school, and community life. Prerequisite: Psychology 207, or 301, or 303.

**307. Child Growth and Development. (3-0). Credit 3. II**

Growth and development of the normal child from infancy to adolescence with emphasis upon the elementary school years. Prerequisite: Psychology 207, or 301, or 303.

**309. Differential Psychology. (3-0). Credit 3. I**

Individual and group differences essential to the evaluation of test results and behavior. Distribution and extent, causative factors, trait organization. Prerequisite: Psychology 207 or 303 or advanced standing in engineering.

**323. Psychology of Adolescence. (3-0). Credit 3. I, II, S**

The psychological problems of the normal teen-age individual, including the consideration of the ways and means of aiding youth to meet these problems constructively. Prerequisite: Psychology 207, or 301, or 303.

**401. Industrial Psychology. (3-0). Credit 3. I, II, S**

Significance of individual differences in industry; instruments and techniques of selecting and placing personnel; motivating, training, and supervising the worker; nature and control of fatigue; psychological aspects of labor relations; morale and attitude measurement; industrial counseling. Prerequisite: Psychology 207, or 303, or advanced standing in industrial engineering or industrial technology.

**403. Dynamics of Human Behavior. (3-0). Credit 3. II** †

The motivation of behavior and the mechanisms of adjustment to conflict. Types of maladjustment and their causation. The development and integration of the personality. Theories of personality. Prerequisites: Psychology 207 or 301 or 303, and 305 or graduate classification in education or sociology.

**406. Psychology of Learning. (3-0). Credit 3. II**

A survey of the significant concepts, experimental methods, and principles of learning. Prerequisite: Psychology 207 or 301 or 303.

**408. Experimental Psychology. (2-3). Credit 3. II**

Applications of experimental method to psychology. Principles and techniques in areas of reaction time, simple motor phenomena, sensation, perception, learning, and social interaction. Prerequisite: Psychology 406 or advanced standing in industrial engineering.

### FOR GRADUATES

**634. Principles of Human Development. (3-0). Credit 3. I, S**

Biological, psychological, and cultural interrelationships in human development. Emphasis upon principles and methods as illustrated in research and theoretical contributions. Experiences in procedures of child study. Prerequisite: Graduate classification.

## Department of Electrical Engineering

Professor G. D. Hallmark,
Professors H. C. Dillingham, J. P. German, L. M. Haupt, Jr., M. C. Hughes,
N. F. Rode, R. P. Ward; Associate Professors J. S. Denison, A. J. Druce,
M. G. Rekoff, Jr.; Assistant Professors B. J. Ball, H. M. Barnard*,
E. N. Roots, Jr., J. N. Yakura; Instructors N. W. Hass,
J. H. Hinton, J. B. Jones, W. P. Worley

**201. Electricity and Magnetism. (3-4). Credit 4. I, II, S**

Lectures, recitations, and problems in electricity and magnetism.

A laboratory investigation of the phenomena studied in the textbook. Prerequisite: Mathematics 121 or 209.

**214. Electrical Circuit Theory. (3-3). Credit 4. I, II, S**

An introduction to electrical circuit theory. Complex numbers, phasor algebra, and response of single mesh and series-parallel circuits. Resonance phenomena and the poles and zeros of impedance and admittance are defined. Prerequisites: Electrical Engineering 201; registration in Mathematics 307.

**305. Electrical Circuits and Machines. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of electrical circuits, including fundamental electronic circuits, machines, and control devices. The practice is designed to familiarize the general engineering student with test procedures for and characteristics of both direct and alternating current machines. Prerequisites: Mathematics 122 or 210; Physics 219.

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*On leave of absence from 9-1-61 to 8-31-62.

**307. Electrical Circuits. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of direct and alternating current circuits.

The practice includes measurements of the circuit phenomena, including fundamental amplifiers and rectifiers. Prerequisites: Mathematics 122 or 210; Physics 219.

**308. Electrical Machinery. (2-3). Credit 3. I, II, S**

A study of the principal types of electrical machines, including their characteristics, applications, and control devices.

The practice includes actual operation and testing of electrical machinery and equipment most commonly used in industry. Prerequisite: Electrical Engineering 307.

**322. Electric and Magnetic Fields. (3-0). Credit 3. II, S**

Application of vector analysis to the theory of electric and magnetic fields. Maxwell's equations are used to study the propagation and reflection of electromagnetic waves. Prerequisites: Electrical Engineering 214; Mathematics 308 or registration therein.

**323. Electrical Circuit Theory. (3-0). Credit 3. I, II**

General circuit analysis and theorems for lumped constant, passive circuits. Steady state and transient response is studied by classical methods and by the behavior of impedance and admittance functions in the complex frequency plane. Prerequisites: Electrical Engineering 214; registration in Mathematics 308.

**324. Electrical Circuit Theory. (3-0). Credit 3. II, S**

A continuation of the study of lumped constant passive circuits, including transform methods of analysis, two terminal pair networks and three-phase circuits. Prerequisites: Electrical Engineering 323; Mathematics 308.

**325. Electronics. (3-0). Credit 3. I, II**

An introduction to the theory of electron tubes and transistors. Thermionic, gaseous, light sensitive, and cathode ray tubes; solid state devices, rectifier circuits and amplifier equivalent circuits will be covered. Prerequisites: Electrical Engineering 214, registration in 323.

**326. Electronic Circuits. (3-0). Credit 3. II, S**

A study of the basic circuits used in radio, television, and computers. An analytical study of modulators, demodulators, oscillators, and amplifiers. Prerequisites: Electrical Engineering 325, registration in 324.

**327. Electrical Laboratory. (1-3). Credit 2. I, II**

Studies of the precision and accuracy of measurement. Electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 323, 325 or registration therein.

**328. Electrical Laboratory. (1-3). Credit 2. II, S**

Studies of the precision and accuracy of measurement, electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 322, 324, 326 or registration in these courses.

**330. Electrical Machinery. (3-0). Credit 3. I, II, S**

An introduction to energy conversion concepts and devices with detailed study of DC machines. Prerequisites: Electrical Engineering 324, 328 or registration therein.

**331. Theory and Application of Electron Tubes. (3-3). Credit 4. I, S** †

For students other than electrical engineering majors. A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. Prerequisite: Electrical Engineering 307.

**401. Electrical Machinery. (3-0). Credit 3. I** †

A graphical and mathematical study of electrical machines, including transformers. Prerequisites: Electrical Engineering 324, registration in 403; Mathematics 308.

**402. Electrical Machinery. (3-0). Credit 3. II** †

A continuation of the study of synchronous machines; asynchronous machines, polyphase and single phase motors; rectifiers and converters and control equipment. Prerequisites: Electrical Engineering 401, 403, registration in 404.

**403. Electrical Laboratory. (0-6). Credit 2. I**

A laboratory study of the electrical machines covered in Electrical Engineering 401. Prerequisites: Electrical Engineering 324, 328, registration in 401.

**404. Electrical Laboratory. (0-6). Credit 2. II** †

A continuation of the laboratory study of electrical machines covered in Electrical Engineering 401, 402. Prerequisites: Electrical Engineering 401, 403, registration in 402.

**406. Electric Power Distribution and Transmission. (2-2). Credit 3. II** †

Lectures and recitations on the transmission and distribution of power by electrical methods including symmetrical components. Detailed calculations of line constants, lightning phenomena, switching surges, and cost estimates of transmission and distribution systems. Prerequisite: Electrical Engineering 415.

**415. Transmission Networks. (2-2). Credit 3. I** †

An analytical study of the theory of transmission lines and impedance matching devices. Hyperbolic-function treatment is generalized to apply to power, electronic, and communication circuits. The laboratory will consist of group problems and demonstrations. Prerequisites: Electrical Engineering 324; Mathematics 308.

**420. Servomechanisms and Control Devices. (3-0). Credit 3. II** †

A general study of closed-loop control devices, including electrical, hydraulic and mechanical systems. Prerequisites: Electrical Engineering 307 or 323; Mathematics 308.

**428. Communication Circuits. (2-3). Credit 3. I** †

A study of the engineering principles used in wire line communications, including telephone and telegraph systems, transmission theory, inductive interference, networks, filters, loading, repeater and carrier systems. Laboratory investigations include transmission measurements on artificial lines involving the use of vacuum tube measuring devices and impedance bridges. Prerequisite: Electrical Engineering 415 or registration therein.

**432. Economic Phases of Engineering. (2-0). Credit 2. II**

Problems in the mathematics of finance, depreciation, engineering economy, accounting, distribution factors, and rates with particular reference to the electric power industry. Prerequisite: Electrical Engineering 401.

**439. Electronic Systems. (3-0). Credit 3. I, II**

A study of the application of devices and circuits to complete systems in the field of communication, instrumentation, and control. Prerequisites: Electrical Engineering 324, 326, 328.

**441. Symmetrical Components of Polyphase Circuits. (3-0). Credit 3. I** †

The solution of current, voltages, and power flow during fault conditions on a power transmission system by the application of a method of symmetrical components. Prerequisite: Electrical Engineering 308 or 401.

**451. Applied Electromagnetic Theory. (3-0). Credit 3. I** †

Static boundary value problems; conformal transformation; the Schwarz transformation; rectangular harmonics; cylindrical harmonics; Bessel functions; mathematics of Bessel functions; spherical harmonics; Legendre polynomials; applications of Maxwell's equations to plane waves in dielectrics and conductors; Maxwell's equations applied to antennas; radiation; fields and power calculations; antenna impedances. Prerequisites: Electrical Engineering 322; Mathematics 308.

**452. Ultra High Frequency Techniques. (2-3). Credit 3. II** †

An introduction to the theory and practice of ultra high frequency radio wave generation, transmission, and radiation. Development of Maxwell's equations and their application to transmission of electrical energy in wave guides. Prerequisites: Electrical Engineering 322, 326.

**454. Advanced Electronic Circuits. (3-3). Credit 4. II** †

A study of the electronic circuits used for pulsing, counting, computing, and regulating and as wide band amplifiers. Transistor and tube elements will be considered. The laboratory will consist of measurements on typical devices. Prerequisite: Electrical Engineering 326.

**456. Communication Theory. (3-0). Credit 3. II** †

Introduction to the processing and transmission of information with emphasis on the mathematics and block diagrams of systems. Includes elements of information theory, effects of signal-noise ratio, methods of modulation and demodulation. Prerequisite: Electrical Engineering 454 or registration therein.

**457. Principles of Electronic Computers. (3-3). Credit 4. II** †

Organization and internal operation of analog and digital computers; function integration, addition, multiplication, and generation; analog system simulation; switching networks; Boolean algebra applied to digital computer components; analysis and synthesis of sequential devices, digital computer memories, input and output devices; the arithmetic unit. Prerequisite: Electrical Engineering 326 or registration therein.

**481. Seminar. (0-2). Credit 1. I**

Written reports and oral presentations of selected topics from current literature in the various fields of electrical engineering. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of electrical engineering. Prerequisite: Second semester senior classification.

**485. Problems. Credit 1 to 3 each semester. I, II**

Research and design problems of limited scope approved on an individual basis intended to promote independent study. The results of the study will be presented in writing, and an oral presentation to the staff and students will be required. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**601.* Advanced Alternating Currents. (3-4). Credit 4. I, S**

Wave analysis; mechanical and electrical wave analyzers; non-linear circuits; multiple winding transformer theory; transient solution of general network. The study of transients with oscillographs.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**602.* Advanced Alternating Currents. (3-4). Credit 4. II**

Steady-state and transient solution of recurrent networks, operational calculus methods of solution of circuits with lumped and distributed constants, non-linear circuits.

**605.* Linear Servomechanisms. (3-3). Credit 4. I**

A continuation of Electrical Engineering 420 to include advance topics which will extend the study of analytic methods as applied to linear systems and introduce concepts related to linear systems synthesis. Prerequisite: Electrical Engineering 420.

**606. Non-Linear Servomechanisms. (3-0). Credit 3. II**

A study of techniques available to analyze non-linear systems, discontinuous systems, and discrete data systems, and a study of associated synthesis procedures. Prerequisites: Electrical Engineering 605; Mathematics 617.

**607. Alternating Current Circuits and Machines. (3-4). Credit 4. I**

The study of transient conditions in electrical machines.

**611. Symmetrical Components Applied to Electrical Engineering. (3-4). Credit 4. I**

The solution of unbalanced electrical circuits by means of symmetrical components; the study and measurements of machine constants by means of the oscillograph.

**624. Electronic Circuits for Instrumentation and Computation. (3-3). Credit 4. II**

Theory, analysis, and design of the electronic circuits used in instrumentation and computation. AC amplifiers, operational amplifiers, "and" circuits, "or" circuits, and "gate" circuits are included. Problems of drift compensation in DC amplifiers and closed-loop stability in multi-stage amplifiers are treated in detail. Prerequisites: Electrical Engineering 326, 457.

**626. Introduction to Electron Tube Design. (4-0). Credit 4. I**

The motion of ions in electric and magnetic fields, electron emission, and conduction through gases are studied. The applications of mass spectrometry, electron optics, and electron tube design are considered.

**628.* Design of Active Networks. (4-0). Credit 4. II**

A study of regeneration and feedback theory with emphasis on circuit design methods suitable for treatment of these topics. Prerequisites: Electrical Engineering 601; Mathematics 601 or the equivalent.

**636. Network Synthesis. (4-0). Credit 4. I**

Synthesis of electrical networks having arbitrarily specified terminal characteristics. Studies include realizability conditions, realization of general two-terminal and four-terminal networks and approximation of network specifications. Prerequisites: Electrical Engineering 601; Mathematics 601.

**637. Wave Guides and Cavities. (3-0). Credit 3. I**

Application of Maxwell's equations to the solution of guided electromagnetic fields. Course includes studies in skin effect, parallel plane wave guides, rectangular wave guides, circular wave guides, cavities, and microwave networks. Prerequisite: Electrical Engineering 451.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**638. Antennas and Propagation. (3-0). Credit 3. II**

Application of Maxwell's equations to determine the electromagnetic fields of antennas. Course includes studies in radiation, directional arrays, impedance characteristics, aperture antennas, propagation in free space, and propagation through the ionosphere. Prerequisite: Electrical Engineering 451.

**642. Transistors. (3-3). Credit 4. I, S**

Theory of junction triodes; voltage, current, power and frequency limitations. Small signal parameters and equivalent circuits for transistors; analysis of design of circuits at both small and large signal levels. Prerequisite: Electrical Engineering 326.

**653. Electronic Computer Design. (3-3). Credit 4. I, S**

Special function generation and system simulation for analog solution of both linear and non-linear differential equations, simulation techniques applied to control systems; advanced study of digital adders, subtractors, accumulators, multipliers, and dividers; digital error-detection; digital control; design of general purpose and special purpose digital computers. Prerequisite: Electrical Engineering 457.

**685. Problems. Credit 1 to 4 each semester. I, II**

Research problems of limited scope designed primarily to develop research technique.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation.

## Department of Engineering Graphics

Professor W. E. Street,
Professors S. M. Cleland, B. F. K. Mullins, J. P. Oliver, C. H. Ransdell, L. E. Stark; Associate Professors B. A. Hardaway, P. M. Mason; Assistant Professors N. B. Bardell, Jr., R. H. Davey, Jr., J. H. Earle

**105. Engineering Drawing. (0-6). Credit 2. I, II, S**

Care and use of drawing instruments and equipment, vertical freehand lettering, engineering geometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

**106. Descriptive Geometry. (0-6). Credit 2. I, II, S**

Point, line, and plane relationships. Bearings and slopes of lines. Contours, cuts, and fills. Strike and dip. Successive auxiliary view problems. Revolution about an axis and true length diagrams. Developments and intersections. Prerequisite: Engineering Graphics 105.

**127. Industrial Freehand Sketching. (1-3). Credit 2. II**

Basic techniques of freehand drawing in line and tone; delineation of form, textures, materials, sketching, and industrial applications of freehand drawing.

**128. Methods of Industrial Reproduction. (0-2). Credit 1. II**

Basic techniques of reproduction processes for industrial use.

**209. Nomography. (2-0). Credit 2. II, S**

Theory of type selection, design and construction of charts and graphs; methods and application of graphical mathematics for engineering and scientific problem solutions; theory and construction of nomographs including parallel scale charts, "N" or "Z" charts, proportional charts, and combined charts. Course is designed to enable students to properly present solutions of problems and technical reports encountered in junior, senior, and graduate courses. Prerequisites: Engineering Graphics 105, 106; Mathematics 121 or the equivalent.

**221. Building Construction Drawing. (1-3). Credit 2. II**

Architectural details in frame and masonry construction; general drawings and techniques of presentation. (For students in industrial education and building products marketing.) Prerequisite: Engineering Graphics 105 or the equivalent.

**403. Graphical Computation Devices. (1-3). Credit 2. II, S**

To teach the theory and methods of construction of graphical computation devices and to apply their use to the solutions of engineering and scientific problems. Prerequisites: Engineering Graphics 105, 106.

## FOR GRADUATES

**601. Advanced Industrial Drawing. (2-3). Credit 3. I, S**

Problems pertinent to all industrial fields. Solutions involve projections, primary auxiliary views, successive auxiliary views, revolutions, flat pattern layouts, perspective, and shades and shadows. Use of drafting machines and other special drafting equipment. Appropriate for high school and college teachers. Prerequisite: Engineering Graphics 106 or equivalent.

**603. Advanced Machine Drawing. (1-6). Credit 3. II, S**

Conventional practices, dimensioning, fastenings, machine and pictorial sketching. Empirical design including problems of stuffing boxes, piping, shafting, gears, cams, ship and aircraft parts. Use of special drafting equipment such as drafting machine, section liner, proportional dividers, erasing machines, light table, and mechanical lettering guides. Methods of reproduction. Appropriate for high school and college teachers. Prerequisite: Engineering Graphics 106 or equivalent.

**605. Spherical Projections.* (2-0). Credit 2. I, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Graphics 106 or the equivalent.

**606. Stereographic and Clinographic Projections.* (2-0). Credit 2. II, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Graphics 106 or the equivalent.

**607. Descriptive Geometry for Teachers.* (4-0). Credit 4. II, S**

Fundamental concepts of descriptive geometry. The design and organization of problems and teaching devices for college teachers. Prerequisite: Engineering Graphics 106 or the equivalent.

**611. Technical Illustration.* (3-3). Credit 4. I, S**

Axonometric projection including shading. Design and construction of display layouts. Commercial and technical illustrating. Prerequisite: Engineering Graphics 106 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable an individual or a small group to undertake and complete with credit numerous problems in graphical communication. It may be limited investigations, laboratory work, or conferences and discussion. Prerequisites: Engineering Graphics 105, 106; graduate classification; and approval of the instructor.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of Graduate Studies.

## Department of English

Professor S. S. Morgan,
Professors J. P. Abbott, J. Q. Anderson, R. H. Ballinger, F. E. Ekfelt, J. Q. Hays, E. D. Hedgcock, C. D. Laverty; Associate Professors A. L. Bennett, K. E. Elmquist, C. A. Greer, L. F. Hauer, H. E. Hierth, H. L. Kidd, Jr., L. J. Martin, E. E. Stokes, Jr.; Assistant Professors R. W. Barzak, R. E. Cain, S. S. Cox, H. S. Creswell, E. P. Crittenden, C. K. Esten, M. A. Huggett, P. C. Hunter, Jr., J. S. Jernigan, W. B. Kadow, L. B. Keel, H. P. Kroiter, T. J. Mattern, J. F. Peirce, F. W. Powell, Allen Schrader, J. N. Shepperd, Victor Wiening; Instructors G. E. Gott*, K. L. James, H. J. Luke, Jr., R. B. Nichols, F. A. Rodewald, C. E. Schatte

**100. English for Foreign Students. (3-0). Credit 3. II, S**

Fundamentals of speaking and writing in English for students whose native language is not English. Students entering the course are expected to have studied English and to be able to communicate in English. **No credit will be granted for the satisfactory completion of this course.** (See the entry for course 100 under the Department of Modern Languages.)

**103. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. Readings in modern prose (non-fiction). Emphasis on language study and the mechanics of writing. (Special sections are offered for students of high proficiency and low proficiency in writing.)

**104. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

**203. Introduction to Literature. (2-0). Credit 2. I, II, S**

Reading in three of the following types: plays, stories, novels, and poems, chiefly modern. Papers on the readings. Prerequisites: English 103, 104.

**207. Report Writing and Correspondence. (2-0). Credit 2. I, II**

The writing of technical reports and business letters. Prerequisites: English 103, 104.

**210. Introduction to Logical Discourse. (2-0). Credit 2. I, II, S**

The principles of reasoning and their application in reading and writing. Prerequisites: English 103, 104.

**212. Shakespeare. (3-0). Credit 3. I, II, S**

A study of the major plays of Shakespeare, with lectures on his life, his language, and his cultural environment. Prerequisites: English 103, 104.

**231. Survey of English Literature. (3-0). Credit 3. I, II, S**

A survey of the literature of England from Anglo-Saxon times to Dr. Samuel Johnson. Prerequisites: English 103, 104.

**232. Survey of English Literature. (3-0) Credit 3. II, S**

A survey of the literature of England from mid-eighteenth century to the twentieth century. Prerequisites: English 103, 104.

**301. Writing for Professional Men. (3-0). Credit 3. I, II, S**

Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program of English.

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*On leave of absence from 9-1-61 to 5-31-62.

**309. The English Language. (3-0). Credit 3. I** †

Survey of the grammatical structure, vocabulary, and history of the English language, with brief discussion of related languages. Prerequisites: Two courses in sophomore English. (Offered in 1961-62 and in alternate years thereafter.)

**310. Phonetics and Pronounciation. (3-0). Credit 3. II** †

Introductory discussion of the nature of language and of language study. Detailed study of the formation of English sounds, of usage in pronunciation, and of phonetic and phonemic principles. Prerequisites: Two courses in sophomore English. (Offered in 1962-63 and in alternate years thereafter.)

**315. Seventeenth Century Literature. (2-0). Credit 2. I, S**

A period course in English poetry and prose of the seventeenth century, not including Shakespeare. Prerequisites: Two courses in sophomore English.

**316. Eighteenth Century Literature. (2-0). Credit 2. I, S**

A period course in English poetry and prose of the eighteenth century. Prerequisites: Two courses in sophomore English.

**319. Report Writing. (1-0). Credit 1. I**

The preparation of technical reports in the form observed by the Petroleum Division of the A.I.M.E., the American Petroleum Institute, and the American Association of Geologists. Prerequisite: English 104.

**320. Selected Reading. (1-0). Credit 1. I, II**

The reading of five books. Objects: to teach students to read good books and to enjoy and understand good literature.

**321. Nineteenth Century Literature (Romantic). (3-0). Credit 3. I** †

A study of the intellectual tendencies of the nineteenth century as reflected in the poetry of Wordsworth, Coleridge, Byron, Shelley, Keats, and others. Prerequisites: Two courses in sophomore English.

**322. Nineteenth Century Literature (Victorian). (3-0). Credit 3. II** †

A continuation of the study in nineteenth century thought as reflected in the writings of Tennyson, Browning, Arnold, and other Victorians. Prerequisites: Two courses in sophomore English.

**325. Creative Writing. (2-0). Credit 2. I**

The writing of stories, one-act plays, essays, editorials, and feature articles. Limited to students who have made an average of C in the prerequisite courses. Prerequisites: Two courses in sophomore English.

**327. American Literature to 1870. (2-0). Credit 2. I** †

A study of American literature from the Colonial Period through the Civil War. Prerequisites: Two courses in sophomore English.

**328. American Literature from 1870 to 1920. (2-0). Credit 2. II** †

A study of American writing from Whitman and Mark Twain to Frost and Dreiser. Prerequisites: Two courses in sophomore English.

**329. Folklore and Folk Songs. (3-0). Credit 3. II**

Folklore and folk songs beginning with Old English ballads and continuing through Indian, Negro, French, and Spanish types in the United States. Prerequisite: Freshman English.

**334. Science in Literature. (3-0). Credit 3. II**

The main developments in the history of science as they are presented in the literature of the Western World. Prerequisites: Two courses in sophomore English. (Offered in 1962-63 and in alternate years thereafter.)

**336. Life and Literature of the Southwest. (3-0). Credit 3. II**

A study of the culture of the Southwest as expressed in literature. Prerequisite: A course in sophomore English. (Offered in 1961-62 and in alternate years thereafter.)

**340. Modern Drama. (3-0). Credit 3. II, S** †

A study of representative plays (in translation) by such dramatists as Ibsen, Hauptmann, Rostand, and Pirandello on the Continent, and Pinero, Shaw, Synge, O'Neill, and Maxwell Anderson in England and America. Prerequisites: Two courses in sophomore English.

**350. Modern Literature. (3-0). Credit 3. I** †

British and American novelists, poets, and dramatists from about 1920 to the present, with lectures on the social and intellectual background. Prerequisites: Two courses in sophomore English. (Offered in 1962-63 and in alternate years thereafter.)

**371. Great Books. (3-0). Credit 3. I, II, S**

Greek plays, Roman lives (from Plutarch), Dante's **Inferno,** Shakespeare's **King Lear,** a Russian novel, twenty English poems, a modern novel. Prerequisite: Completion of the sophomore program in English.

**372. Great Books. (3-0). Credit 3. II, S**

Offered in alternate semesters with English 371. Typical works: Homer's **Iliad,** Lucretius' **On the Nature of Things,** Chaucer's **The Canterbury Tales** (selected), Rebelais' **Gargantus and Pantagruel,** Marlowe's **Dr. Faustus,** Cervantes' **Don Quixote,** Goethe's **Faust** (Part 1), Dostoyevsky's **Crime and Punishment,** and James' **The Turn of the Screw.** Prerequisite: Completion of the sophomore program in English.

**375. Great American Writers. (2-0). Credit 2. II**

The most important works of five or six distinguished American writers of the nineteenth and twentieth centuries chosen from Emerson, Melville, Whitman, Twain, James, Glasgow, and Frost. Prerequisite: One course in sophomore English.

**381. Play Production. (2-3). Credit 3. I**

Production of plays from the point of view of the director, the actor, and the technician. Students will participate in at least two plays with some work in television. Prerequisite: Completion of the sophomore program in English.

**382. Stagecraft. (2-0). Credit 2. II**

Methods of staging plays—scene design and construction as well as stage lighting. Participation in plays scheduled. Prerequisite: Completion of the sophomore program in English.

**401. Public Speaking. (0-2). Credit 1. I, II, S**

Practice in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the sophomore program in English.

**403. Speaking for Professional Men. (1-2). Credit 2. I, II, S**

Speech training for technical students in their professional fields. Speeches of social and technical interest; group discussions; parliamentary procedure. Prerequisite: Completion of sophomore program in English.

**407. Speaking and Oral Interpretation. (1-2). Credit 2. II**

Speech training with special attention to the student's professional field and instruction and practice in the oral interpretation of literature, both prose and poetry. (Students may not receive credit for both English 403 and 407.) Prerequisite: Completion of sophomore program in English.

**412. Shakespeare. (3-0). Credit 3. II** †

Close attention to the plays themselves. The student will also devote time to the texts, to Elizabethan language, to Elizabethan dramatic theory and history and Shakespeare's relation to them, and to Shakespeare criticism and scholarship. Prerequisite: English 212 or six hours of 300 or 400 level courses in literature.

**428. The Novel in English. (3-0). Credit 3. I** †

A study of the novel in English in the eighteenth, nineteenth, and early twentieth centuries. Prerequisites: Two courses in sophomore English. (Offered in 1962-63 and in alternate years thereafter.)

**431. Chaucer. (3-0). Credit 3. I** †

Readings from the works of Chaucer, with consideration of the institutions and society of the pre-Renaissance period and Chaucer's language. Prerequisite: English 231 or six hours of 300 or 400 level courses in English.

**461. Teaching of Language and Composition. (3-0). Credit 3. S** †

A study of administrative and teaching problems involved in high school and college courses in composition. The organization and presentation of courses designed to improve student writing; various points of view toward language study held by teachers and students of linguistics; papers written by students and graded and criticized by instructor; supervised practice in grading and criticizing of student writing; the organizing of the curriculum in English from the grades to college. The course is intended for students expecting to teach English, for teachers of other subjects, and for principals and superintendents confronted with problems of organizing and administering the English program. Prerequisite: Senior classification or approval of instructor.

**485. Problems. Credit 1 to 3. I, II, S** †

Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his over-all knowledge of literature and the criticism of literature. There will be written reports on the readings and a semester examination. Prerequisite: Eighteen hours of English.

## FOR GRADUATES

**613. Studies in the Renaissance. (3-0). Credit 3. I**

Reading in the poetry, prose, and drama exclusive of Shakespeare. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**616. Studies in the Eighteenth Century. (3-0). Credit 3. II**

Poetry and prose from Dryden to Blake. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**632. Studies in the Nineteenth Century. (3-0). Credit 3. I**

Romantic and Victorian writers, along with the literary, religious, and scientific issues of the century. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**675. Studies in American Literature. (3-0). Credit 3. II**

Reading in American writers, with emphasis on a particular literary development or on a literary type. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Special readings designed to supplement the student's knowledge of English and American literature in subjects which he has not studied in other courses. Research papers. Prerequisites: Graduate classification; approval of the Head of the Department.

**691. Research. Credit 1 to 4. I, II, S**

Research for thesis. Prerequisite: Graduate classification.

## Department of Entomology

Professor J. C. Gaines,
Professor V. A. Little; Associate Professors P. L. Adkisson, J. R. Brazzel, L. W. Getzin, R. L. Hanna, D. R. King, M. A. Price, N. M. Randolph, J. N. Weaver; Assistant Professors H. R. Burke, H. A. Turney

**201. General Entomology. (2-2). Credit 3. I, II, S**

A study of the principal orders of insects; the relation of anatomy and physiology of insects to control methods; the principal insecticides and their uses; the development, habits, and economic importance of the more common insects with control methods for the injurious species.

**208. Veterinary Entomology. (2-3). Credit 3. I, II**

A study of insects and other arthropods that are parasitic upon domestic animals concerned in the transmission of diseases. Methods of eradication and control are emphasized. Prerequisite: Sophomore classification in preveterinary medicine and animal husbandry.

**301. Systematic Entomology. (2-3). Credit 3. I** †

A systematic study of the orders and families of insects, and the distinguishing characteristics of representative species. The preparation of insect collections and the use of keys for identification are emphasized in practice. Prerequisite: Entomology 201 or equivalent.

**302. Systematic Entomology. (2-3). Credit 3. II** †

A continuation of Entomology 301, including orders and families of insects not included in Entomology 301. Prerequisite: Entomology 301.

**305. Insect Morphology. (2-3). Credit 3. I** †

General morphology of typical insects with special emphasis on those structures of particular importance in systematic and applied entomology. Prerequisite: Entomology 201 or equivalent.

**306. Insect Physiology. (2-3). Credit 3. II** †

Internal anatomy and principles of physiology as applied to insects. Prerequisite: Entomology 305.

**313. Biology of Insects. (2-3). Credit 3. I**

General biology and taxonomy of the classes of Arthropoda. Emphasis is placed on the orders and more important families of Hexapoda, their marks of identification, general biology, and their relations to other animals. The use of keys for the identification of insects and other arthropods is stressed in the laboratory. Prerequisite: Three hours of biological sciences.

**401. Principles of Insect Control. (2-3). Credit 3. I** †

A study of both applied and natural controls emphasizing the uses, practical application, and the physical and chemical properties of the more important insecticides. Prerequisite: Entomology 201.

**402. General Economic Entomology. (2-3). Credit 3. II** †

The nature of injury, life history, habits and control of the common insects attacking stored products, cereal, forage, cotton, ornamentals, fruits, vegetables, man, household, and livestock are studied. Practical methods of insect control are demonstrated in laboratory. Prerequisite: Entomology 201.

**405. Horticultural Pests. (2-2). Credit 3. II**

This course deals with insect problems of fruit, nuts, truck crops, and ornamentals. The biologies, type of damage, and recognition of these pests are considered. Also the approved insecticidal, biological, and natural controls as well as preventive measures are studied. Prerequisite: Entomology 201 or the equivalent.

**423. Comparative Anatomy of Arthropods. (2-3). Credit 3. I**

A detailed comparison of the digestion, respiration, circulation, excretion, and nervous system of arthropods and related animals. Taxonomic characters are also stressed. Prerequisite: Entomology 305 or equivalent.

**424. Insect Ecology. (2-3). Credit 3. II**

The effect of environmental factors upon the distribution, abundance, competition, and ecological succession of insects. Prerequisite: Entomology 302 or equivalent.

**481. Seminar. (1-0). Credit 1. I, II**

Report of original investigations, current literature, and special features. Required for entomology seniors and graduate students each semester.

**485. Problems. Credit 1 to 4. I, II, S**

Individual problems for beginners in research. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**601, 602. Systematic Entomology. (3-3). Credit 4 each semester. I, II**

A taxonomic study of the orders and families, including genera and species of the class Hexapoda; a study of the International Rules of Nomenclature. A special study of some particular group of insects is required in practice. Prerequisite: Entomology 302.

**607. Economic Entomology. (3-3). Credit 4. I, S**

This course is designed chiefly for workers in vocational agriculture and the Extension Service. It includes studies of agricultural pests, their biologies, economic importance as determined by making infestation records, and the use of control measures. Also, insecticides and methods of application are considered. Prerequisite: Approval of Head of Department.

**608. Economic Entomology. (3-3). Credit 4. II**

A detailed study of insect pests, including identification, distribution, principles and methods of natural, cultural, and chemical controls. Literature and research methods are also stressed. Prerequisite: Entomology 401 or 402.

**613, 614. Morphology. (3-3). Credit 4 each semester. I, II**

A detailed study of anatomical structures of insects. Prerequisite: Entomology 305.

**615. Insect Physiology. (3-3). Credit 4. I**

A study of the physiology of respiration, circulation, digestion, and excretion; the mechanical and chemical senses of insects are considered. Prerequisite: Entomology 306 or equivalent.

**617, 618. Medical Entomology. (3-3). Credit 4 each semester. I, II**

The taxonomy and biology of parasitic insects, ticks, mites and their role in the causation and transmission of diseases affecting man and domestic animals. Prerequisite: Entomology 208 or equivalent.

**619. Insect Toxicology. (3-3). Credit 4. II**

Chemical compounds which possess toxic properties; actions of poisons on insects; evaluation of insecticides in the laboratory and field; and mathematical analysis of data. Prerequisite: Entomology 615.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Entomological problems not pertaining to a thesis or dissertation are considered. Prerequisites: Graduate classification with major or minor in entomology; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research problems on taxonomy, life histories, biological control, ecology, and physiology of insects, and the toxicology of insecticides. Prerequisite: Graduate classification.

## Department of Geography

Professor G. W. Schlesselman,
Professor F. E. Smith; Associate Professor E. B. Doran, Jr.

**201. Principles of Geography. (3-0). Credit 3. I, II, S**

A study of the differences in physical and cultural environment over the earth's surface, with emphasis on the changes in the landscape created by man. Culture "worlds" are recognized as a means of presenting these differences in orderly fashion.

**203. Physical Geography. (3-3). Credit 4. I, II**

This course consists of a systematic description and interpretation of the distribution patterns and the regional associations of natural phenomena on the face of the earth.

**204. Economic Geography. (3-0). Credit 3. I, II**

A study of the commercial regions of the world, dealing with the production types or occupations, such as grazing, plantation farming, grain farming, fishing, lumbering, mining, and manufacturing.

**302. Geography of Europe. (3-0). Credit 3. II**

A geographical survey of Europe as a whole and of the individual countries.

**303. Geography of South America. (3-0). Credit 3. I**

Investigations of trade opportunities in South America. The economic activities of the major geographic regions as reflecting the present day utilization of the natural resources. Possibilities of future development.

**304. Geography of Asia. (3-0). Credit 3. II**

A general study of the continent of Asia and a more detailed study of selected regions.

**306. Meteorology. (3-0). Credit 3. I**

This course aims to present concisely and systematically the science of meteorology in its present state of development. The primary purpose is to set forth the facts and principles concerning the behavior and responses of the atmosphere.

**310. Climatology. (3-0). Credit 3. II**

A study of the nature and elements of climate and the factors that give rise to climatic differences and that determine the distribution of climatic types.

**312. Conservation of Natural Resources. (3-0). Credit 3. II**

A study of natural resources including ways and means of insuring wise utilization of essential or strategic resources.

**320. Geography of the Pacific Basin. (3-0). Credit 3. I**

Geographic aspects of the Pacific Ocean area. Physical characteristics, native people, discovery and exploration, political and economic factors; regional studies of sub-areas.

**401. International Political Geography. (3-0). Credit 3. I** †

A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments.

**485. Problems. Credit 1 to 4. I, II**

Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of the Head of the Department.

### FOR GRADUATES

**601. Economic Geography. (4-0). Credit 4. I**

A regional survey of the world distribution of major agricultural and industrial commodities with particular attention to the causal action of national, social, and economic factors. (Offered in 1961-62 and in alternate years thereafter.)

## Department of Geology and Geophysics

Professor S. A. Lynch,
Professors H. R. Blank, Peter Dehlinger, T. J. Parker, W. L. Russell*, F. E. Smith; Associate Professors K. J. Koenig, M. C. Schroeder, C. L. Seward, Jr.;
Assistant Professor S. H. Yungul

### GEOLOGY

**201. General Geology. (3-0). Credit 3. I, II**

The agents and processes that have produced the surface features of the earth and the structure of the earth's crust. Prerequisites: Chemistry 101 or 103 or equivalent; registration in Geology 203 or 207; registration in Geology 209 for majors in geology, geophysics, and geological engineering.

**203. Crystallography and Mineralogy. (2-6). Credit 4. I**

Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chemistry 102 or 104; Engineering Graphics 106; Mathematics 102, 103.

**204. Mineralogy and Rock Study. (1-3). Credit 2. II, S**

Continuation of Geology 203. Recognition and classification of common rocks by their megascopic characteristics. Prerequisites: Chemistry 207 or registration therein; Geology 203.

**205. Elementary Geology. (3-3). Credit 4. I, II**

General principles of physical geology, physiography, geologic processes, and an introduction to historical geology. Laboratory work on common minerals, rocks, and maps. Primarily for arts and science students.

**206. Elementary Historical Geology. (3-3). Credit 4. I, II**

An introduction to historical geology, including a review of the hypotheses of the earth's origin, the significance of fossils, the origin and character of selected geologic formations, and the development of the North American continent. Prerequisite: Geology 201, or 205, or 320.

**207. Mineralogy and Rock Study. (2-6). Credit 4. I**

Practical hand specimen determination of common minerals and rocks by means of their physical properties. Study of well cuttings and cores. This course should be taken simultaneously with Geology 201. A course designed for petroleum engineers. Prerequisites: Chemistry 102 or 104; Mathematics 103 or the equivalent.

**209. Introduction to Field Work. (0-3). Credit 1. I**

One-half day each week studying geologic processes. Scientific methods of field work are stressed. Should be taken concurrently with Geology 201 and cannot be taken for credit after credit is received for Geology 210.

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*On leave of absence from 9-1-61 to 6-1-62.

**210. Historical Geology. (3-3). Credit 4. II, S**

Principles of stratigraphy and paleontology, the physical and organic record of the earth's history, hypotheses of the earth's origin. Prerequisites: Chemistry 102 or 104; Engineering Graphics 106; Geology 201 and 203, or 201 and 207, or 205 and approval of Head of Department; Mathematics 102, 103.

**299. Field Geology. Credit 2. Intersession**

Geological observations and mapping in an area exhibiting diversity of rock types, structures, and physiography. Prerequisites: Geology 201; approval of Head of Department.

**300. Field Geology. Credit 6. S**

Geologic mapping in selected areas in the Llano Uplift and the Marathon Basin. Written report. Prerequisites: Civil Engineering 208; Geology 204, 305, 306, 312.

**303. Petrography and Petrology. (2-3). Credit 3. I** †

Principles of optical mineralogy; identification of minerals in fragments and thin sections by use of the petrographic microscope; thin section study of igneous rocks, and their classification. Prerequisites: Chemistry 207; Geology 204.

**304. Sedimentary Petrography. (2-3). Credit 3. II** †

Microscopic study of sedimentary and metamorphic rocks in thin sections; heavy mineral analysis; description, origin, and classification of sedimentary and metamorphic rocks. Prerequisite: Geology 303.

**305. Invertebrate Paleontology. (3-3). Credit 4. I**

The morphology, classification, and geologic range of the principal invertebrate groups. Prerequisite: Geology 210.

**306. Stratigraphy. (3-3). Credit 4. II**

Stratigraphic studies of the United States with emphasis on the Gulf Coastal Plain formations and their correlation by means of invertebrate fossils. Laboratory studies consist of stratigraphic principles and the changing faunas through geologic time. Prerequisite: Geology 305.

**309. Agricultural Geology. (3-3). Credit 4. II**

Erosion, transportation, and deposition by water, wind, and ice. Chemical and physical processes of development and destruction of soils. Origin, development, and interpretation of surface features of the earth. Elements of earth structure and geologic history. Earthquakes, volcanoes, and mountains. Laboratory work in determination of rock-making minerals and common rocks and interpretation of topographic and geologic maps.

**312. Structural Geology. (2-3). Credit 3. II**

The interpretation of rock structures; their relation to stratigraphic, physiographic, and economic problems. Prerequisites: Geology 201, 204 or 207, 210.

**315. Principles of Sedimentation. (2-3). Credit 3. I**

Factors of environment, production, transportation, and deposition of sediments; products resulting from the operation of sedimentary processes; structures, textures, and colors of sediments. Laboratory work in collecting and sampling, mechanical analysis, methods of analyzing and presenting data. Prerequisites: Chemistry 207; Geology 201, 203, 204, 210.

**320. Geology for Civil Engineers. (2-3). Credit 3. I, II**

Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundations, and excavation. Prerequisite: Sophomore classification in civil engineering.

**399. Field Geology of the Gulf Coast Tertiary. Credit 6. S**

Mapping, stratigraphy, and structure in the Tertiary of the Gulf Coast area. Given as a summer field camp. May be used to substitute for Geology 433 and 4 hours of technical elective. Prerequisite: Geology 300.

**404. Geology of Petroleum. (2-3). Credit 3. I**

Origin, migration, and accumulation of petroleum. Typical United States oil and gas fields. Laboratory work in subsurface geology. Prerequisites: Geology 300, 306, 312.

**406. Economic Geology. (3-0). Credit 3. I** †

The application of principles of geology, chemistry, and physics to the formation of useful minerals and rocks and a general survey of such deposits. Prerequisites: Chemistry 323; Geology 300, 306, 312.

**409. Geology of Non-Metallics Other than Petroleum. (3-0). Credit 3. II** †

The mineralogy, stratigraphic, and structural relations, origin, geographic distribution, uses, and economics of non-metallic mineral deposits other than petroleum. Prerequisites: Chemistry 323; Geology 300, 306, 312.

**422. Natural Structural Materials. (2-3). Credit 3. II**

Building stones and stone products, with special emphasis on clays and clay products, their qualities, occurrences, uses, and processes of fabrication and manufacture. For students registered in architecture or engineering. Prerequisite: Junior classification.

**423. Micropaleontology. (1-6). Credit 3. II** †

A systematic survey of the important groups of micro-fauna with particular emphasis on their classification and use. Prerequisite: Geology 305.

**425. Subsurface Geology. (2-3). Credit 3. II** †

Study of well cuttings and cores; electrical, radioactive, drilling time, and caliper logs. Preparation of subsurface contour maps and cross sections. Prerequisites: Geology 300, 404; approval of Head of Department.

**431. Geomorphology. (2-3). Credit 3. I**

Principles and fundamentals of geomorphology. Laboratory work in advanced map interpretation. Prerequisites: Geology 300, 306, 312.

**433. Field Geology. (0-6). Credit 2. II** †

Two full afternoons per week devoted to the acquirement of techniques of field geology in areas adjacent to the campus. Prerequisites: Geology 300, 306.

**437. Cenozoic Micropaleontology. (1-6). Credit 3. I** †

Cenozoic micro-fauna of the Gulf Coast Province with emphasis on subsurface correlation. Prerequisite: Geology 423.

**441. Advanced Engineering Geology. (3-3). Credit 4. I** †

A survey of those phases of mineralogy, petrology, historical geology, structural geology, and sedimentation that may be applied to engineering problems. Not available to geology or petroleum engineering majors. Prerequisites: Senior classification; approval of Head of Department.

**481. Seminar. (1-0). Credit 1. I**

Review of current literature and technical developments. Discussion of certain legal aspects of the petroleum industry. Each student will make both oral and written reports. Prerequisites: Geology 300, 306, 312.

**482. Seminar. (1-0). Credit 1. II**

Continuation of Geology 481. Each student will prepare more advanced reports. Prerequisites: Geology 300, 306, 312.

**485. Problems. Credit 1 to 3. I, II, S**

Advanced problems in geology.

## FOR GRADUATES

**600. Earth Science for Secondary School Teachers. (2-3). Credit 3. S**

Survey of the fundamental principles of physical geology, geologic processes, and earth history including the origin and nature of the solar system. Designed to aid secondary school instructors in presenting earth sciences. Prerequisites: Graduate classification; approval of Head of Department.

**601. Advanced Research Techniques. (1-0). Credit 1. I**

An introduction to modern instrumentation techniques and methods used in geology. Prerequisite: Graduate classification.

**609. Field Geology. Credit 2 to 6. I, II, S**

Systematic geologic surveying of selected areas. Prerequisite: Geology 300.

**612. Structural Geology. (3-0). Credit 3. I**

A detailed study of geologic structures and a consideration of theories regarding earth movements, with selected readings. Prerequisite: Geology 312.

**616. Micropaleontology. (1-6). Credit 3. I**

Study of microscopic fossils and their uses in correlation. Laboratory work in the examination of well samples. Prerequisite: Geology 423.

**618. Sedimentation. (3-0). Credit 3. II**

Investigation of processes of sedimentation with analytical laboratory work on sedimentary rocks. Seminar. Prerequisite: Geology 315.

**619. Petroleum Geology. (3-0). Credit 3. II**

A theoretical study of some of the problems in petroleum geology. Prerequisite: Geology 404.

**620. Geology of Ground Water. (3-0). Credit 3. I**

Principles of occurrence and movement of water beneath the earth's surface, and the influence of various geologic situations upon its behavior. Factors applying to estimates of supply. Engineering aspects of ground water.

**622. Stratigraphy. (3-0). Credit 3. I**

Sources and depositional environment of sediments, character and relation of sedimentary strata, and the principles involved in delimiting, correlating, and naming stratigraphic units.

**625. Advanced Ground Water Geology. (3-0). Credit 3. II**

Seminar course in the application of the principles of advanced geology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent; approval of Head of Department.

**627. Continental Evolution Outside of North America. (2-0). Credit 2. II**

A reading and conference course on the available literature, dealing with the basic geology of areas outside of North America in which industries and governments are asking for the services of American geologists. Designed for students contemplating foreign service. Areas to be studied will be suited to individual needs.

**629. Structural Framework of North America. (3-0). Credit 3. II**

Description of the important geologic structures of North America and of the development of regional structural features in geological times. Prerequisite: Graduate classification.

**631. Geology in Engineering Construction. (3-0). Credit 3. II**

Geologic principles applied to the construction of highways, foundations, bridge abutments and piers, tunnels, dams, reservoirs, etc. Construction materials. Test borings and their interpretation. Prerequisites: Graduate classification; approval of instructor.

**639. Paleozoic and Mesozoic Paleontology. (3-0). Credit 3. I**

Study of the important faunas of these eras. Prerequisites: Graduate classification; approval of Head of Department.

**640. Cenozoic Paleontology. (3-0). Credit 3. II**

Study of the important faunas of this era with emphasis on the megafossils of the Gulf Coast. Prerequisites: Graduate classification; approval of Head of Department.

**643. Paleozoic Stratigraphy. (3-0). Credit 3. II**

Stratigraphy of the Paleozoic System with particular emphasis on the Paleozoic of West Texas and Oklahoma. Prerequisites: Graduate classification; approval of Head of Department.

**644. Mesozoic Stratigraphy. (3-0). Credit 3. II**

Study of the stratigraphy of the Mesozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**645. Cenozoic Stratigraphy. (3-0). Credit 3. II**

Study of the Cenozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**646. Gulf Coast Stratigraphy. (3-0). Credit 3. II**

Detailed study of the Mesozoic and Cenozoic Systems of the Gulf Embayment. Prerequisites: Graduate classification; approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geology to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geological problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geology. Research for thesis or dissertation.

## GEOPHYSICS

**435. Principles of Geophysical Exploration. (3-3). Credit 4. I** †

Principles of the different methods used in geophysical exploration with emphasis on the interpretation of geophysical data and physical properties of rocks. Prerequisites: Geology 312; Mathematics 122 or 210; Physics 219; approval of Head of Department for majors in other departments.

**436. Seismic Exploration. (2-3). Credit 3. II** †

Study of seismic investigations with artificial sources, including field procedures, instrumentation, and interpretation of data. Prerequisite: Geophysics 435.

**446. Physics of the Earth. (3-0). Credit 3. II** †

A study of the earth's elastic and inelastic behavior, its gravitational, magnetic, electrical and thermal fields, the effect of forces acting within the earth, and implications of these factors during geologic time. Prerequisites: Geology 312; Mathematics 122 or 210; Physics 219; approval of Head of Department for majors in other departments.

**485. Problems. Credit 1 to 3. I, II, S** †

Advanced problems in geophysics.

### FOR GRADUATES

**651. Theoretical Seismology. (3-0). Credit 3. I**

Mathematical development of elasticity theory and stress waves in bounded and unbounded solid media. Prerequisites: Geophysics 435 or registration therein; Mathematics 308; approval of Head of Department for majors in other departments.

**653. Gravity and Magnetic Methods. (3-0). Credit 3. II**

Study of the earth's gravity and magnetic fields; the role of gravity in geodesy; methods, instruments, and interpretation of data in gravity and magnetic methods of exploration. Prerequisites: Geophysics 435; Mathematics 308.

**655. Electrical and Radioactivity Methods. (2-0). Credit 2. II**

Study of procedures, instruments, and interpretation of data obtained from electrical, electromagnetic, and radioactivity methods of exploration. Minor emphasis is on geothermal and geochemical methods. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**657. Earthquake Seismology. (2-0). Credit 2. I**

Study of earthquakes, their causes, effects, method of location, determination of wave paths, interpretation of deep structures; and instruments used for recording. Prerequisites: Geophysics 435, 651 or registration therein.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geophysics to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geophysical problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geophysics. Research for thesis or dissertation.

## Department of Health and Physical Education

Professor C. E. Tishler,
Professors A. D. Adamson, W. M. Dowell, C. W. Landiss, W. L. Penberthy,
H. B. Segrest; Associate Professors P. M. Andrews, Emil Mamaliga, L. L.
Palmer, N. A. Ponthieux; Assistant Professors C. E. McCandless,
R. K. Wieder; Instructor H. H. Walton

### HEALTH EDUCATION

**216. First Aid. (0-3). Credit 1. I, II, S**

Prepares students for Red Cross Standard, Advanced, and Instructor's First Aid Certificates.

**218. Athletic Injuries. (1-3). Credit 2. II**

A study of the conditioning and training of the individual and team; care and prevention of injuries. Prerequisites: Biology 219; Health Education 216.

**415. Secondary School Health Education. (3-0). Credit 3. I, S** †

A study of health problems; needs of the individual; cooperation of home and community; resources for health in community, state, and nation; techniques of evaluation. Prerequisites: Biology 225; approval of instructor.

**421. Elementary School Health Education. (3-0). Credit 3. II** †

A study of modern trends and methods in the elementary school health program; survey of materials and agencies and their value to an adequate health program. Prerequisites: Biology 225; approval of instructor.

### FOR GRADUATES

**631. Community and Public Health. (3-0). Credit 3. S**

A study of community health problems and of public health measures to solve them. Typical organizations and specific functions of state and local health departments; relationship of local health department to state and federal health agencies and programs. Prerequisite: Health Education 415 or 421. (Offered in 1961-62 and in alternate years thereafter.)

## PHYSICAL EDUCATION

Physical Education 101, 102, 201, and 202 are required in all curricula. Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be urged to register for general conditioning activities. All others may elect to register for one of the following activities: adapted activities, badminton, basketball, bowling, boxing, conditioning, diving, fencing, golf, gymnastics, handball, life saving, soccer, speedball, swimming, tennis, trampolining, volleyball, water polo, weight training, or wrestling. The purpose of these courses is to teach the student through instruction and practice the fundamental knowledge and skills of at least two activities in which he will be able to participate in adult life. No student will be permitted to repeat an activity unless he has failed it.

Students may elect Physical Education 301, 302 for credit of one hour each after having completed the required courses.

**101. Required Physical Education. (0-2). No credit. I, II**

**102. Required Physical Education. (0-2). No credit. I, II**

**201. Required Physical Education. (0-2). No credit. I, II**

**202. Required Physical Education. (0-2). No credit. I, II**

**210. Life Saving and Pool Management. (1-3). Credit 2. II**

Designed to qualify students for Red Cross Senior Life Saving and Instructor's certificates; includes a study of sanitary codes and pool sanitation, problems of pool and waterfront management; selection of personnel. Prerequisite: Advanced swimming. (Offered in 1962-63 and in alternate years thereafter.)

**211. Physical Education Activities. (1-3). Credit 2. I**

A basic course designed to provide instruction and development of skill in physical education activities with emphasis on team type activities other than in the major sports.

**212. Physical Education Activities. (1-3). Credit 2. II**

This course is designed to provide instruction and development of skill in physical education activities with emphasis on individual and dual type sports.

**213. Introduction to Health and Physical Education. (3-0). Credit 3. I, II**

The approach, fundamental principles and application of principles; definition, traditions, developments, psychology, aims, objectives, and results of physical education; building a program of health and physical education. Prerequisites: Sophomore classification; approval of instructor.

**221. Safety Education. (2-0). Credit 2. I**

A study of the general program of safety education; accidents, preventive measures, traffic safety, safety at home, school, and work; visual aids, safety projects, special programs; utilization of agencies outside of school.

**226. Introduction to Recreation. (2-0). Credit 2. II**

A study of the nature, extent, significance, and history of recreation; leadership personnel, its function, training, and selection; planning recreation areas and facilities; program planning and activity organization.

**251. Coaching of Basketball. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in basketball.

**253. Coaching of Baseball. (1-3). Credit 2. II**

Teaching of individual techniques; position play; training; team offensive and defensive strategy. Prerequisites: Junior classification; approval of instructor. (Offered in 1961-62 and in alternate years thereafter.)

**255. Coaching of Track. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in track and field events.

**301. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**302. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**315. Elementary School Physical Education. (3-0). Credit 3. II**

Organization of physical activities in public schools; methods in teaching games used in public school programs. Prerequisites: Junior classification; approval of instructor.

**316. Secondary School Physical Education. (3-0). Credit 3. I**

Class organization, control, and management; methods of presenting subject matter; special methods in activities. Prerequisites: Junior classification; approval of instructor.

**317. Coaching of Football. (1-3). Credit 2. II**

Teaching of fundamentals; individual techniques; training; offensive and defensive strategy; officiating.

**321. Coaching of Tennis. (1-3). Credit 2. I**

Analysis, theory and practice of tennis strokes; strategy; methods of coaching; organizing and conducting tournaments. Prerequisites: Junior classification; approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

**325. Outdoor Activities. (2-0). Credit 2. II**

A course designed to acquaint the student with the function of the camp and outdoor activities as educational agencies through the medium of practical projects and activity, organization, problems, and modern programs in the various areas.

**331. Sports in American Culture. (3-0). Credit 3. I**

A study of the history and evolution of sports; the role and cultural implications of sports in American democracy; the Olympic games; sports and their function in American schools and colleges.

**423. Administration of Health and Physical Education. (3-0). Credit 3. II, S** †

Administrative problems involved in the coordination of the health, physical education, intramural, and athletic areas in a comprehensive program of physical education. Prerequisites: Biology 225; Health Education 415; Physical Education 213.

**425. Tests and Measurements. (3-0). Credit 3. I, II, S** †

Use, interpretation, evaluation, and administration of existing tests in health and physical education; application of elementary statistical procedures. Prerequisites: Health Education 415; senior classification.

**427. Remedial Exercises. (3-0). Credit 3. I**

Elementary techniques in diagnosing functional and structural defects; procedures of individual exercise with emphasis on preventive and remedial measures. Prerequisites: Biology 219, 220; approval of instructor.

**428. Corrective Therapy. (3-9). Credit 6. II, S**

This course is cooperative with the Veterans Administration Hospital and is taught at the VA Hospital in Houston. The course is taught for a six-week period and consists of theory and practice in corrective therapy procedures. Prerequisites: Physical Education 427; approval of Head of Department.

**450. Directed Teaching. (2-12). Credit 6. I, II**

Construction of lesson plans, observation and supervised practice teaching in public schools. Prerequisites: Physical Education 316; senior classification.

**481. Seminar. (1-0). Credit 1. I, II, S**

General discussion of professional ethics and current problems relating to health, physical education, and athletics. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Survey of Research. (3-0). Credit 3. S**

A study of published reports and research in the field of health and physical education. Prerequisite: Education 426 or Physical Education 425.

**603. Coaching and Officiating. (3-0). Credit 3. S**

Advanced coaching and officiating techniques in football, basketball, track, and baseball. Prerequisites: Teaching and coaching experience.

**610. Administration of Interschool Athletics. (2-0). Credit 2. S**

This course is designed for school superintendents, principals, and athletic directors. A study of the University Interscholastic League rules and regulations and the various problems confronting the school administrator in administration of the interschool athletic program.

**614. Philosophy and Principles. (3-0). Credit 3. S**

Divergent origins, leaders, conditions, and forces affecting the development of health and physical education. Critical analysis of objectives. Principles of education, psychology, and physiology, and their implications in health and physical education. Prerequisite: General prerequisite for minor. (Offered in 1961-62 and in alternate years thereafter.)

**622. Supervision of Health and Physical Education. (3-0). Credit 3. S**

Methods and policies of the school supervisor; conferences, planning and presenting the program, evaluating results, improving teachers-in-service. Prerequisite: Physical Education 423. (Offered in 1962-63 and in alternate years thereafter.)

**636. Advanced Tests and Measurements. (3-0). Credit 3. S**

Critical study of tests and measurements available; methods of constructing and evaluating new tests and measurements. Prerequisite: Physical Education 425. (Offered in 1962-63 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislative certification, professional ethics, and other current problems relating to health, physical education, and recreation. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Directed study of selected problems of health, physical education, and recreation not related to a thesis. Prerequisites: Graduate classification; approval of the instructor.

## Department of History and Government

Professor J. M. Nance,
Professor A. B. Nelson; Associate Professors W. E. Benton, J. T. Duncan*, C. H. Hall, H. H. Lang, T. L. Miller; Assistant Professors A. C. Ashcraft, G. E. Bayliss, R. L. Harris, L. C. Taylor, Jr., C. E. Wynes; Instructors E. R. Arango, P. A. Ford, Fred Gantt, Jr., H. L. Grant, Jr., C. M. Hepburn, E. A. Hudgins, M. T. Kyre, Jr., H. M. Monroe, Jr., N. R. Stout

### GOVERNMENT

**305. Government of the United States and Texas. (3-0). Credit 3. I**

The organization, functions, and nature of the national government; the rights and privileges of citizenship; the immigration and naturalization laws, all as closely related to the constitution as possible, are treated first. A similar treatment is then applied to the government of Texas. Open only to military juniors and seniors in agricultural education and industrial education.

**306. American National Government. (3-0). Credit 3. I, II, S**

The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible. Prerequisite: Sophomore classification.

**307. State and Local Government. (3-0). Credit 3. I, II, S**

The nature, organization, and general principles of local government in the United States with especial attention to these forms of government in Texas. Prerequisite: Government 306 or its equivalent. Required as condition to degree of all students who have not had at least three semester hours credit in military training before graduation.

**308. United States Constitutional Development. (3-0). Credit 3. II**

A study of leading decisions of the Supreme Court. The various trends in our constitutional growth since 1789 are treated, as well as the expansion through judicial interpretation of the powers delegated to the national government. Some attention is given to legal terminology and to the composition and functioning of the national judiciary. Required of all pre-law students in three-year pre-law program. Prerequisites: Government 306; History 105.

**310. Comparative Government. (3-0). Credit 3. II**

A survey of major European governments. Stress will be placed upon the parliamentary democracies of Great Britain, France, West Germany, and Italy. The dictatorships of the U.S.S.R. and Spain will also be considered. Governmental background, structure, and operation will receive attention. Prerequisite: Junior classification. (To be offered in 1962-63 and in alternate years thereafter.)

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*On leave of absence from 9-1-61 to 8-31-62.

**315. American Political Parties. (3-0). Credit 3. I**

A study of the organization, history, and functions of political parties, and the place they occupy in the operation of national, state, and local governments in the United States. Attention is concentrated on the two major political parties, but some attention is given third party movements. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**320. Elements of Political Thought. (3-0). Credit 3. II**

A study of ancient, medieval, and modern concepts of government as developed by the principal contemporary political writers, and as reflected in political institutions. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**335. Government and Politics of Latin America. (3-0). Credit 3. I**

The constitutional development, political institutions, and contemporary political problems of the principal Latin American countries, with special emphasis on the present day constitutions and government structure. Prerequisite: Six hours of government. (To be offered in 1961-62 and in alternate years thereafter.)

**436. Municipal Government. (3-0). Credit 3. I**

Designed for students who may enter the municipal service as well as for those who desire only a general knowledge of city government. Urban growth; legal position of cities; forms of government; the mayor, council, city manager, and municipal courts; relation of city to state; the political process; municipal ownership; services; metropolitan problem; special reference to Texas cities. Prerequisite: Government 305 or 306. (To be offered in 1962-63 and in alternate years thereafter.)

## HISTORY

**105. History of the United States. (3-0). Credit 3. I, II, S**

English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and the slavery problem; war for Southern independence. (See "Requirement in Government and History," page 97.)

**106. History of the United States. (3-0). Credit 3. I, II, S**

Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; World War I; reaction and the New Deal; World War II; contemporary America. Prerequisite: History 105.

**213. History of England. (3-0). Credit 3. I, II**

British, Saxon, and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament. Required in three-year pre-law program.

**214. History of England. (3-0). Credit 3. I, II**

Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the twentieth century; growth of the Empire until World War II. Required in three-year pre-law program. Prerequisite: History 213.

**217. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe in the Middle Ages. A survey of the development of European civilization from the decline of the Roman Empire to the Renaissance. The course is designed to give the student historical perspective as well as a basic historical knowledge of the period. Major topics include the Graeco-Roman heritage, the barbarian migrations, the growth and development of the church, the rise of capitalism, medieval society, and the origin of nationalism in Europe. Required of majors in history.

**218. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe from the Renaissance to the present. A survey of modern European civilization, dealing especially with the Renaissance and the Reformation, the Age of Reason and the French Revolution, the Napoleonic wars, the growth of nationalism and democracy in the nineteenth century, the causes and consequences of the two world wars and the rise of dictatorship. Required of majors in history. Prerequisite: History 217.

**302. Colonization of North America. (3-0). Credit 3. II** †

Geographic setting; early English, French, Dutch, Swedish discovery, conquest, and settlement, 1497-1763; colonial administration; colonial life; inter-colonial wars. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1962-63 and in alternate years thereafter.)

**313. The Latin-American Nations to 1820. (3-0). Credit 3. I** †

The period when the Americas south of the United States belonged to Spain and Portugal; discovery; colonial system; social and economic aspects; the wars of independence to the founding of the republics. (To be offered in 1962-63 and in alternate years thereafter.)

**314. The Latin-American Republics, 1820 to the Present. (3-0). Credit 3. II** †

The twenty Latin-American republics since 1820; independence and the dictators; rise of the ABC states; Latin-American civilization after a century of independence; relations with Europe and with the United States in Pan-American movement; participation in world affairs. (To be offered in 1962-63 and in alternate years thereafter.)

**315. The United States, 1901 to the Present. (3-0). Credit 3. II, S** †

A study of United States history during the twentieth century. Emphasis is placed primarily on the development and application of progressive principles from the "square deal" of the first Roosevelt to include the subsequent "new deal" and "fair deal" of the Roosevelt and Truman administrations; secondary emphasis is on the international relations of the United States as the nation became a world power, moved from isolation to leadership and back, followed by the development of the "good neighbor" policy toward Latin-America and our participation in World War II. The United Nations and problems.

**318. International Developments since 1918. (3-0). Credit 3. I, II, S** †

A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question, and the clash of United States-Japanese policies. World War II; the conflict of ideologies.

**325. Trends in American History. (3-0). Credit 3. I, II, S**

The sources and development of leading American institutions constituting representative democracy, their influence upon our nation's development and upon the twentieth century world. Course stresses the institutional rather than the chronological and political aspects of the United States, endeavoring to present what has been well styled "The Epic of America." Students who have credit for History 105 or 106 may not receive credit for History 325. Required of all students offering only three semester hours in American history toward the legal requirement for a baccalaureate degree. Prerequisite: Sophomore classification.

**326. History of Texas. (3-0). Credit 3. I, II, S**

A history of Texas from the Spanish period to the present day. Stress will be placed upon the period of Anglo-American settlement, the revolution, the republic, and the development of the modern state. Prerequisite: Sophomore classification.

**331. Medieval Civilization. (3-0). Credit 3. I** †

History of medieval thought ranging from the influeence of Plato and Aristotle to the age of Erasmus and Machiavelli. The course outlines the intellectual history of the Middle Ages and includes in broad outline the interests of man in philosophy, science, education, law, and religion. Prerequisite: Six semester hours of history.

**332. Renaissance and Reformation. (3-0). Credit 3. II** †

A study of the fifteenth and sixteenth centuries with emphasis upon the intellectual history of the era. Political ideas, art, and humanism of the Renaissance are stressed. The doctrinal controversy and the beliefs of Luther, Calvin, and Zwingli are emphasized in the Reformation. Prerequisite: Six semester hours of history.

**375. Tudor and Stuart England. (3-0). Credit 3. I, S** †

Study of the changes in the social, economic, and religious organization of England from 1485 to 1689; developments in the international position of England; the rise of Puritanism; the conflict between crown and Parliament; the Interregnum, Restoration, and "Glorious Revolution." Prerequisites: Twelve hours in history, including History 213, 214 or History 217, 218.

**411. The Old South. (3-0). Credit 3. I, S** †

A history of the antebellum South. Emphasis will be placed on the following topics: physical bases of Southern regionalism; Southern alignments on national issues; the slavery-plantation economy and society of the Old South; secession and formation of the Confederacy. Prerequisite: History 106 or 325.

**412. Civil War and Reconstruction. (3-0). Credit 3. II** †

Survey of the background and causes of the war; military, political, economic, and diplomatic aspects of the war; life behind the lines; reconstruction and post-war adjustments, 1861-1877. Prerequisite: Twelve hours of history, or six hours of history and six hours in sophomore courses in other social sciences. (To be offered in 1962-63 and in alternate years thereafter.)

**415. The Institutional Background of Texas, 1519-1845. (3-0). Credit 3. I, S** †

A study of the history of Texas from the Spanish period to annexation to the United States. Particular stress is placed upon the Spanish legal and administrative system. The Mexican administrative system, the establishment of Anglo-Americans in Texas, the revolution, the republic, and the fight for annexation. In each of these topics emphasis is placed upon principles and developments of this period which are reflected in the state's present-day society. (To be offered in 1961-62 and in alternate years thereafter.)

**416. Texas Since 1845. (3-0). Credit 3. II, S** †

A history of Texas since annexation. Careful attention is given to social, cultural, economic, and political developments, and to the place of Texas in national affairs. (To be offered in 1961-62 and in alternate years thereafter.)

**421. Far East, 1895 to Present. (3-0). Credit 3. II** †

Brief survey of the government, politics, and civilizations of China, Japan, India, Pakistan, and Southeast Asia; the political picture in the Far East at the end of the Sino-Japanese War, 1895; spheres of influence; Boxer Rebellion; colonialism and nationalism; rise of republicanism; Far East in two world wars; international developments in the Far East; Korean War. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1961-62 and in alternate years thereafter.)

**422. International Rivalry in the Gulf-Caribbean Area, 1840 to the Present. (3-0). Credit 3. I** †

Background of Spanish colonial policy, with British, French, and Dutch intrusion; conflict of interests; influence of islands on mainland settlement. Early United States interest; Monroe Doctrine and its extension; vital treaties with Colombia and Great Britain. European interests in the islands, Central America, Mexico, and Venezuela. Later policies of the United States, rise of Pan-Americanism and Pan-Hispanism. First reciprocal trade treaties and rise of United States imperialism. Policy of "the good neighbor" under Wilson and Roosevelt. Recent progress of Pan-Americanism toward western hemisphere solidarity. (To be offered in 1961-62 and in alternate years thereafter.)

**423. American Foreign Relations. (3-0). Credit 3. I, S** †

The history of the United States foreign relations and development of our leading foreign policies to 1868. The Revolution and alliance with France; the development of isolation and neutrality; neutral rights and the War of 1812; nationalism and the Monroe Doctrine; Manifest Destiny and its consequences; diplomacy of the Civil War; the Monroe Doctrine applied to France in Mexico; the "Alabama" claims arbitration. (To be offered in 1962-63 and in alternate years thereafter.)

**424. American Foreign Relations. (3-0). Credit 3. II, S** †

The history of the United States foreign relations and development of our leading foreign policies, 1875 to the present; America becomes a world power; imperialism; World War I and the failure of neutrality; the League of Nations and its desertion; Pan-Americanism; failure of disarmament and rise of aggression; neutrality fails again; World War II; United Nations and problems. (To be offered in 1962-63 and in alternate years thereafter.)

## FOR GRADUATES

**607. The United States, 1763-1800. (3-0). Credit 3. I**

A study of the causes of the American Revolution, the Revolution, the Articles of Confederation, and final union under the Constitution. Careful attention will be given economic and social developments as well as political developments. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**609. American Historical Writing. (3-0). Credit 3. I, S**

A survey of American historical writing and historiography from 1607 to the present, with some attention to bibliographical guides to sources and literature of the United States. Prerequisites: Twelve hours of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**610. The Trans-Mississippi West. (3-0). Credit 3. II**

A study of the West in American history. The course will emphasize political, economic, social, and cultural influences of the frontier. Extensive reading will be required. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1962-63 and in alternate years thereafter.)

**611. American Leaders. (3-0). Credit 3. II, S**

The personalities and contributions of thirty-six American leaders from Samuel Adams to Dwight Eisenhower. Prerequisites: Twelve hours of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**612. The French Revolution and Napoleon. (3-0). Credit 3. II**

Detailed consideration of the decline of the ancient regime, the influence of the Encyclopedists, the causes and course of events during the revolution; and a study of the Napoleonic Era. Critical evaluation of the source material as well as interpretation of the historical importance of the period is stressed. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**615. Growth of Spanish Institutions in America, 1492-1857. (3-0). Credit 3. I**

A study of the growth of political, economic, religious, military, and related institutions, both in theory and in practice, as proposed, developed, and applied in the Spanish-American colonies and nations, 1492-1857. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual instruction in selected fields of history. The course will stress reports and wide reading in the field selected. Prerequisites: Eighteen hours of history and government; graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research. Credit will be given only upon acceptance of completed thesis. Prerequisites: Twelve hours of advanced history; graduate classification.

## Department of Industrial Education

Professor C. H. Groneman,
Professor L. V. Hawkins; Associate Professor L. B. Hardeman; Assistant Professors C. A. Bertrand, J. L. Boone, Jr., L. V. Patterson

**105. Woodcraft. (1-5). Credit 3. I, II**

A comprehensive study of woods, wood products, and wood industries; including growth and botanical structure, production and uses, design, construction, and finishing.

**106. Sheet Metal. (1-5). Credit 3. II**

A study of industrial practices in developing, laying-out, and fabricating sheet metal products. Problems involving parallel-line, radial-line, and triangulation will be provided.

**107. Industrial Materials and Manufacturing Processes. (2-3). Credit 3. I, II**

A study including the processing of woods, metals, fuels, ceramics, and plastics; the fabrication of products from these materials; concepts of accepted manufacturing processes. Laboratory work will consist of problems involving experimentation.

**204. Development and Practice in Industrial Education. (3-0). Credit 3. II**

The history and development of industrial education, its meanings and objectives. Applications of vocational preparation for industry, vocational practices, and developments within industry.

**205. Ornamental Iron. (1-5). Credit 3. I**

A study of metals and metal products; including the alloying and proper use of iron, steel, aluminum, copper, brass, and bronze. Problems involving casting, spinning, machining, forging, welding, tubular construction, and electroplating are required.

**301. Methods of Teaching and Class Management. (2-0) or (3-0). Credit 2 or 3. I**

An introduction to the fundamentals of teaching as applied to industrial subjects; the management of the class, equipment, and supplies.

**304. Applied Industrial Electricity. (2-3). Credit 3. I, II**

A theoretical and practical study of electrical circuits, motors, generators, transformers, lighting, controls, and instruments. Laboratory experiences consist of experiments and projects in circuits and machines. Prerequisite: Physics 202.

**308. A Study of Modern Industries. (3-0). Credit 3. I**

The political, historical, and geographical factors which have a direct influence upon the development and distribution of industries. Specific studies of individual industries are made, such as iron and steel, paper, automobiles, petroleum, cement, leather, plastics, and textiles. Essential features of these industries are considered: location, machinery, power, raw material, market, labor.

**310. Course Making. (2-0). Credit 2. II**

Methods of outlining courses of study to meet the needs of the different types of classes. Each student will make a complete course for some particular subject.

**323. Methods of Teaching Mechanical Drawing. (1-3). Credit 2. I**

The student should have completed courses equivalent to Engineering Graphics 105, 106 before attempting this course. Analysis of problems and the selection of instructional material and methods of presentation for general drafting.

**326. General Metalwork. (1-5). Credit 3. I, II**

The designing and construction of power machinery including the development of plans for procedure, jigs, and fixtures. A study is made of materials and industrial processes and procedures of the foundry, welding, and machine shop. Prerequisites: Mechanical Engineering 202, 310.

**327. Industrial Arts Handcraft. (1-5). Credit 3. I**

Development and preparation of instructional materials; designing and building of teaching type projects and problems in plastics, leather, bookbinding, and other related handcraft activities. Prerequisite: Nine hours of industrial laboratory courses.

**328. Industrial Accident Prevention. (3-0). Credit 3. I, II**

Analysis of fundamentals of accident prevention and their application to industrial supervision and management. Prerequisite: Junior classification.

**332. Plastics and Ceramics. (1-3). Credit 2. I**

Sources, manufacture, supply, and uses of plastics and ceramic materials; designs appropriate for plastics projects; essential processes in fabrication of plastics and ceramic objects.

**334. Upholstery. (1-3). Credit 2. II**

Instruction in the essentials of upholstery processes, including the construction of frames and foundations with and without springs. Prerequisite: Industrial Education 105.

**336. Design in the Arts and Crafts. (1-3). Credit 2. II**

Analysis and solution of design problems applicable to the arts and crafts. Experiences are provided for the designing of industrial products related to industrial arts through the use of common presentation media, proportion, balance, and harmony. Prerequisites: Engineering Graphics 105, 127; Industrial Education 105; Mechanical Engineering 106, 201, 202, 309.

**404. Visual Aids for Industrial Subjects. (1-2). Credit 2. I †**

This course is designed to develop an understanding of, need for, construction of, and use of visual aids for instruction in industrial subjects. Student activity consists of determining values of color in aids, use of projection equipment, mock-ups, posters, and blackboard illustrations.

**406. Industrial Guidance. (2-0). Credit 2. I †**

A study of the instruments and techniques of industrial guidance, its relation to education and industry, its meaning and purpose, and the analysis of methods of investigation and guidance procedures.

**409. Methods of Introducing Industrial Organization and Management into Industrial Schools. (2-0). Credit 2. S †**

The management of modern industrial enterprises and the possible adaptation to industrial schools.

**419. Laboratory of Industries Methods. (1-3). Credit 2. II †**

The student will make a study of the units of industries as generally recommended for public school industrial arts and will select, plan, and design problems and projects to meet these requirements.

**420. Follow-up, Visitations, and Coordination in Part-Time Schools. (2-0). Credit 2. S †**

Selecting occupations suitable for young people to learn, placing students in suitable employment on a part-time basis, and coordinating their school duties with their work activities.

**423. Analysis Procedure. (1-2). Credit 2. I, II †**

Analysis is made of occupations to obtain content for instructional information. Jobs and operations are studied to determine the order and content of operation, job description, job evaluation, and job safety.

**424. Organization of Instructional Material. (1-2). Credit 2. S †**

A study will be made of published material available in the student's occupational field. Those parts found suitable for vocational classes will be indexed and organized for class use. Types of instruction sheets found necessary for efficient teaching will be written.

**427. Driver Education. (1-6). Credit 3. II**

A study and the application of state and federal regulations and policies governing the efficient and safe operation of automotive vehicles in traffic.

**429. Foremanship and Supervision. (3-0). Credit 3. I**

Positions of supervisory responsibility in an industrial organization, relation of supervisor to the supervised and supervisors; and procedures for meeting the responsibilities of the positions. Prerequisite: Senior classification.

**438. Industrial Safety. (2-3). Credit 3. II**

Continuation of Industrial Education 328. This course will include analyses of various types of accident prevention; organizations and programs in industry including detail study of typical safety departments; control of environmental hazards including inspections, investigations, mechanical guarding, maintenance, and the application of safety engineering principles in design and specifications. Prerequisites: Industrial Education 328; Industrial Engineering 302; and either Industrial Education 429 or Industrial Engineering 401 or registration therein.

**442. Supervised Teaching in Industrial Arts. (2-12). Credit 6. I, II**

Observation of, and participation in, the activities of a typical industrial arts classroom. The student will prepare lesson plans and present demonstrations to pupils in industrial arts in the public schools of Bryan and College Station. Prerequisites: Industrial Education 204, 301; senior classification.

**444. Industrial Distribution. (3-0). Credit 3. I, II**

A seminar approach to the study of the problems of industrial distribution with the assistance of representatives from the Southern Association of Distributors. Prerequisite: Junior classification.

**447. Electricity and Electronics. (2-3). Credit 3. I, II**

A continuation of Industrial Education 304. Laboratory experiences in the construction and operation of electronic devices, including power supplies, receivers, amplifiers, and electronic controls. Prerequisites: Industrial Education 304; Physics 202.

**481. Seminar in Industrial Education. (1-0). Credit 1. I, II**

General discussion of laws, legislation, certification, professional ethics, and other current problems relating to industrial and teaching fields. Prerequisite: Senior classification.

## FOR GRADUATES

**601. History of Industrial Education. (2-0). Credit 2. I, II, S**

A study of leaders, movements, and agencies with special emphasis on the economic, social, and philosophical factors which have contributed to the development of industrial education in the United States.

**602. Industrial Arts Administration and Supervision. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of industrial arts.

**603. Administration and Supervision of Vocational Industrial Education. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of vocational industrial education.

**604. Industrial Programs for Junior Colleges and Technical Schools. (2-0). Credit 2. I, II, S**

A study of the kinds, purpose, size, accreditation, growth, and teaching problems of the junior colleges, technical institutes, and adult schools, with particular emphasis on organization and presentation of industrial subject material in these schools.

**605. Problems in Industrial Safety. (2-0). Credit 2. I, II, S**

Basic reasons for accidents; prevention of industrial accidents; qualifications and duties of safety consultants; methods of making investigations; making investigations and how to prepare safety reports.

**606. Organization of Industrial Arts Department. (2-0). Credit 2. I, II, S**

Problems in determining the type and size of industrial arts programs for the various types and sizes of schools with plans for the organization of each.

**609. Methods of Teaching High School Drawing. (2-3). Credit 3. I, II, S**

A survey of the field of drawing. The designing and organizing of problems and teaching devices.

**614. Guidance Seminar. (2-0). Credit 2. I, II, S**

The organization of occupational information; educational and vocational guidance; counseling case problems. Prerequisite: Industrial Education 406 or equivalent.

**616. Methods of Teaching Industrial Arts in Secondary Schools. (2-0). Credit 2. I, II, S**

Selecting and organizing instructional material for problems in a particular industrial activity.

**618. Tests and Measurements in Industrial Education. (2-0). Credit 2. I, II, S**

A study of testing and measuring devices and their application to industrial education subjects.

**619. Related Subjects in Part-Time Cooperative Programs. (2-0). Credit 2. I, II, S**

The organization and presentation of content material necessary in part-time cooperative programs, and the direction of the study of the students engaged in such programs.

**621. Philosophy of Vocational Education. (2-0). Credit 2. I, II, S**

The basic principles involved in the development and operation of industrial education programs under the State and Federal vocational laws.

**622. Philosophy of Industrial Arts Education. (2-0). Credit 2. I, II, S**

The principles involved in the development and operation of industrial arts courses and their purpose and function in the field of general education.

**623. Vocational Guidance Procedures. (3-0). Credit 3. I, II, S**

A workshop approach to the study of vocational guidance, programs, relationships, group techniques, and methodology of the clinical approach.

**626. Classroom Management and Shop Organization. (2-0). Credit 2. I, II, S**

The organization of routine procedures to facilitate teaching; setting up roll-checking devices, issuing procedures for tools and materials, keeping material inventory, using assignment charts and progress charts, using student leadership in routine non-teaching class and shop routine, and keeping records.

**627. Teacher Training for Local Supervisors of Trade and Industrial Classes. (2-0). Credit 2. I, II, S**

A course for local supervisors of industrial education programs or individuals responsible for conducting teacher training and upgrading programs on the local level. Methods for organizing and conducting teacher improvement programs, preparation and correlation of instructional material.

**628. Organization of Vocational Industrial Schools and Classes. (2-0). Credit 2. I, II, S**

Methods of making surveys, determining possible vocational education programs to meet the needs of different types of communities and the proper organization for these classes under the State plan for vocational education.

**630. Auto Mechanics. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to the economic selection, operation, and maintenance of the automobile.

**631. Electricity. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to practical theories and their application to electrical units within a high school program.

**632. Cabinet Making. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern methods of kiln drying, veneer construction, upholstery, and fabrication within the furniture industry.

**633. Machine Shop. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern practices and problems in the teaching of advanced machine shop.

**634. Ornamental Metal Work. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to mild steel and tubular metal.

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislation, certification, professional ethics, and other current problems relating to the industrial education teaching profession.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed to enable graduate majors to undertake and complete with credit limited investigations which do not fall within the thesis research and which are not covered by any other course.

**691. Research. Credit 1 to 4 each semester. I, II, S**

Research. Topic subject to approval of the Head of the Department and Committee.

## Department of Industrial Engineering

Professor A. R. Burgess,
Professors J. P. CoVan, S. A. Wykes; Associate Professor R. L. Smith, Jr.;
Assistant Professors D. D. Drew, D. E. Cleveland, R. E.
Kilmer; Instructor J. R. Porter

**202. Introduction to Industrial Engineering. (2-0). Credit 2. II**

The place of industrial engineering in the factory organization. Relationship of industrial engineering to management, purchasing, cost control, inspection, product development, and maintenance. Historical origins and development of the profession.

**302. Production Engineering. (1-2). Credit 2. I, II**

A coordinated study of manufacturing processes and equipment; operation sequence planning; economic aspects of equipment selection. Tooling and processing a product from product design to final assembly for quantity production. Emphasis is placed on latest developments in manufacturing techniques. Prerequisites: Mechanical Engineering 201, 310.

**401. Survey of Industrial Engineering. (3-0). Credit 3. I, II, S** †

A survey of the industrial engineering field; administrative decisions, layout of equipment, materials handling, production control, quality control, motion and time study, cost determination, wage plans, job evaluations, operations research, use of computers by management. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

**403. Production Management. (3-0). Credit 3. I, II**

A survey course in the principles of production for business administration majors. Prerequisite: Senior classification in business administration.

**404. Motion and Time Study. (2-3). Credit 3. I, II** †

Standardization of job conditions; methods improvement and motion economy; use of flow process charts and diagrams, micromotion analysis of motion pictures, simo-charts, multiple-activity charts; allowances; rating methods; taking time studies; use of standard data and development of time formulas. Prerequisite: Junior classification in engineering or business administration.

**410. Current Practices in Industrial Engineering. Credit 3. S** †

A study of outstanding applications of industrial engineering principles through direct visit to the plants in the industrial Middle West. Course comprises a three-week tour, with emphasis on discussion with men in industry who have pioneered in new ideas in organization, labor relations, materials handling, incentive plans, production control, quality control, and other important management techniques. Prerequisite: Senior classification in industrial engineering.

**411. Wage and Salary Control. (3-0). Credit 3. II** †

Personnel procedures, methods of hiring employees, wage systems, wage administration, job evaluation, merit rating, salary classification; fringe benefits, direct and hidden labor costs, morale building. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

**412. Labor and Industry. (3-0). Credit 3. I, II** †

A brief review of the history of organized labor; critical study of fundamental Federal and State laws governing labor-management relations; study of current interpretations of labor laws, controversial labor-management issues and their solutions. Prerequisite: Senior classification in engineering or business administration, or approval of Head of Department.

**414. Statistical Control of Quality. (2-3). Credit 3. I** †

The engineering aspects of controlling quality through the use of statistical methods. Frequency distributions, control charts for variables, control for fraction defective and defects per unit. Sampling inspection plans. Design of specifications; tolerance systems and gaging. Administration of inspection. Prerequisite: Junior classification in engineering.

**415. Production Control. (1-3). Credit 2. I** †

The planning and control of production; operation analysis; routing; scheduling; dispatching; use of visual production charts and boards; inventory control; accumulation of material requirements; design of production control forms; forecasting production requirements; economic lot size; controls for job order, repetitive cycle, and straight line production. Critical path techniques. Prequisite: Industrial Engineering 302, registration in 404.

**416. Factory Layout. (1-6). Credit 3. II** †

The layout of a complete factory for a selected product. Use of machine templates and models; design of materials handling systems; machine erection; auxiliary services; design of storerooms; loading docks; choice of building types; machine selection; estimate of unit costs; estimate of capital requirements; personnel organization; safety considerations in plant layout. Prerequisites: Industrial Engineering 404, 415.

**420. Manufacturing Costs. (3-0). Credit 3. II** †

The study of modern techniques used by engineers for controlling manufacturing costs. Computing probable returns from investments in new plants and new equipment. Use of break-even charts, profit graphs, machine replacement studies, comparison of alternative methods, standard costs, and budgeting, to control manufacturing costs. Introduction to operations research. Prerequisite: Industrial Engineering 414 or registration therein.

**453. Tool Engineering. (2-3). Credit 3. I**

Principles of selection and design of tools, jigs, fixtures, and gages. Economic considerations in the choice of tooling methods. Estimating tooling costs. Dimensioning and tolerances. Methods of locating, clamping, and feeding. Principles of automation. Graphical solution of tool design problems. Numerical control of machine tools. Prerequisite: Civil Engineering 305; Industrial Engineering 202, 302; registration in Mechanical Engineering 337.

**458. Programming of Digital Computers. (3-2). Credit 4. I, II, S** †

Operation of digital computer; flow charts; sub-routines; library programs; floating point; multiple precision; error analysis; optimum coding; symbolic coding; interpretive coding; automatic coding, practical applications. Prerequisite: Senior classification in engineering or physical sciences or approval of the Head of the Department.

**481. Seminar. (0-2). Credit 1. II**

Investigation and report by students of topics of current interest in Industrial Engineering. Experimental studies are made wherever feasible.

**485. Special Problems in Industrial Engineering. Credit 1 to 3. I, II, S**

A course which permits work on a special project in industrial engineering. Project must be approved by the Head of the Department. Prerequisite: Senior classification in industrial engineering.

## FOR GRADUATES

**601. Industrial Surveys. (2-0). Credit 2. II**

Engineering problems related to industrial investigations, reports on organizations, personnel, capital equipment, financial policies, market, etc. Prerequisites: Industrial Engineering 415, 416.

**603. Human Relations in Industry. (4-0). Credit 4. I**

Causes of misunderstandings between management and labor; interdepartmental relations; conditions which influence the attitudes and productivity of the workers; principles of leadership; critical study of current labor-management problems. Direct worker incentive, seasonal bonuses, quality incentives, profit sharing plans for executives, profit sharing for wage earners. Prerequisites: Industrial Engineering 404, 412.

**604. Advanced Time and Motion Studies. (1-6). Credit 3. I**

Advanced methods in time and motion study; balancing operations in a group or assembly line; learning curves; work sampling; memomotion and chronocyclegraph studies; fatigue effects; determination and application of elemental time data; statistical methods in time study. Prerequisite: Industrial Engineering 404 or the equivalent in practical time study experience in industry.

**608. Industrial Case Analysis. (3-0). Credit 3. II**

Practice in the application of principles to the solution of actual case problems involving broad management decisions. Special attention is given to problems indigenous to Texas industry. Prerequisite: Graduate classification in industrial engineering or approval of Head of Department.

**614. Advanced Quality Control. (3-3). Credit 4. I**

Advanced statistical methods applied to quality control problems; significance tests; correlation analysis; sequential sampling; analysis of variance; design of engineering experiments; response surface techniques. Prerequisite: Industrial Engineering 414.

**615. Production and Inventory Control. (3-3). Credit 4. II**

Recent developments in the techniques used to control inventories and production by means of statistical analysis of the problems, simulation techniques, and mechanized execution of the inventory and production control functions. Prerequisites: Industrial Engineering 415; graduate classification in industrial engineering or approval of Head of Department.

**620. Principles of Operation Analysis. (4-0). Credit 4. II**

Use of mathematical models in making decisions; optimizing over-all policies; probability methods, linear programming; transportation models; queing theory; learning curves; information theory; Monte Carlo methods; use of high speed computers for managerial control. Prerequisites: Industrial Engineering 420, 614.

**621. Computer Methods in Industrial Engineering. (2-3). Credit 3. I**

Principles and applications of computers to the solution of various industrial engineering problems. Prerequisites: Industrial Engineering 458; graduate classification.

**641. Computer Languages. (2-3). Credit 3. I**

A study of design and use of computer oriented and problem oriented languages for digital computers. Prerequisites: Industrial Engineering 458; Mathematics 417.

**642. Computer Methods in Applied Sciences. (2-6). Credit 4. II**

Techniques of analysis and programming required to utilize a stored program digital computer for solution of some typical physical systems. Prerequisites: Industrial Engineering 458; Mathematics 609.

**643. Logic of Information Processing. (2-6). Credit 4. II**

Principles and application of digital computers to problems of data reduction, information retrieval, and large scale commercial data processing problem. Prerequisite: Industrial Engineering 641.

**651. Tool Design. (3-3). Credit 4. II**

Design of automatic machine tools; tracer and director control of tool paths; automatic feeding, holding, indexing and ejection of work pieces; tool replacement analysis. Study of cutting forces, workpiece and fixture distortion. Automatic inspection and sorting, assembly, and packaging. Prerequisite: Industrial Engineering 453.

**681. Seminar. (2-0). Credit 2. II**

Group study and discussion of current developments in industrial engineering practices as reported in the literature and as presented by representatives from industry. Prerequisite: Graduate classification in industrial engineering.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in industrial engineering.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in the industrial engineering field; subject to meet the needs of the individual student.

## Department of Journalism

Professor Delbert McGuire,
Professor D. D. Burchard; Assistant Professors W. D. Calvert, J. E. Redden;
Instructors N. P. DuBeau, G. M. Horton

**201. News Writing. (2-3). Credit 3. I**

Beginning reporting; study of types of news; leads; body treatment of story; feature in lead; facts; background and practice in writing straight news story. Prerequisite: Knowledge of typing.

**202. Beginning News Reporting. (2-3). Credit 3. II**

Study of news sources; style; interviewing; news analysis and discussion; handling of various types of news; emphasis on clear writing; practical reporting experience. Prerequisite: Journalism 201.

**205. Principles of Typography. (2-3). Credit 3. I**

Effective use of type, printing equipment, materials and processes for advertising; editorial and commercial printing production; brief history of printing; understanding of illustrations through engravings and stereotype plates; proofreading; copy-fitting; fundamentals of layout and makeup for publications. Prerequisite: Approval of instructor.

**300. Summer Practice. Ten weeks; required; no credit.** S

Summer practice in newspaper, magazine, or other communications office, as approved by the Department Head. Required previous to registration for fourth year. Prerequisite: Junior classification.

**304. Feature Story Writing. (2-2). Credit 3. I**

The writing of magazine and feature stories; types of feature articles; sources; titles; markets; slanting articles for particular markets; style, word usage; beginnings, illustrations.

**306. Newspaper Production and Management. (2-2). Credit 3. II**

The business of managing a newspaper; the community newspaper; study of the weekly and small town daily newspaper as a service organization; social responsibilities; influence of the community; mechanics of printing; managership; business side of conducting a paper. Prerequisites: Journalism 202, 205.

**307. News Editing. (2-3). Credit 3. I**

The editing of news; intensive training in publication style, news evaluation, copy reading mechanics and techniques, headline writing and proofreading; provides understanding of journalistic responsibilities, ethics, laws of communication and the need for accuracy. Prerequisites: Journalism 202, 205.

**308. Newspaper Advertising. (2-3). Credit 3. II**

Advertising layout and copy for newspapers and other publications; intensive practice in newspaper layouts; writing of retail copy; servicing of newspaper accounts. Prerequisite: Approval of instructor.

**309. Advertising Copy, Layout and Production. (2-3). Credit 3. II**

Application of tested advertising methods to the preparation of merchandising copy; layout design; and production of publication advertising. Sales appeals; attention factors, layout planning, illustrations, copy writing, copy testing, and production methods and problems. Prerequisites: Journalism 205, 308.

**311. Radio and Television News Writing. (2-2). Credit 3. II, S**

Study and analysis of basic methods of writing for radio and television; special emphasis on techniques required in processing news copy; pictures and film. Thorough groundwork in fundamentals of radio and television news style; guidance in newsroom operation, getting the story, filming the news; scripting and editing, and handling equipment.

**315. Photography. (1-3). Credit 2. I, II, S**

Fundamentals of photographic theory and practice; cameras, lenses and shutters; light meters; properties of photographic film and paper; exposure and development of the negative; black and white printing processes; use of filters; lighting (natural, flash, and flood). Emphasis on photography as a medium of communication.

**321. Industrial Journalism. (2-2). Credit 3. I, II, S**

A study of the technique of writing technical articles and reporting news related to engineering, industry, science, and other specialized interests; preparation of fact articles for technical and trade journals.

**406. Publicity and Public Relations. (3-0). Credit 3. II** †

Practical analysis of the various fields of publicity and public relations. Students make surveys and perform laboratory work on actual projects. Theory and practice in various aspects of functioning publicity, including news writing, advertising, and radio.

**409. History and Principles of Journalism. (3-0). Credit 3. I**

Development of American journalism from colonial times to the present, projecting the press as an institution against the background of the economic, social, and political history of the nation. Includes ethics of the profession.

**410. Publications Editing and Designing. (1-3). Credit 2. II**

Advanced editing, headline writing, rewriting, and news evaluation for all types of publications; intensive laboratory practice in advanced copyreading, telegraph wire copy editing, story selection, page makeup, picture and feature material editing, editorial supervision and training in planning various publication formats. Prerequisite: Journalism 307.

**412. Editorial Writing. (3-0). Credit 3. II**

The writing of editorials; editorial page; editorial campaigns; what constitutes editorial policy; ethics in editorial writing. Prerequisite: Journalism 304.

**415. Agricultural Journalism. (2-2). Credit 3. I, II, S**

The principles of newspaper writing; especially the preparation of material for agricultural papers and country weeklies; the part a country paper should play in country development; in the laboratory work, opportunity is given for actual writing for newspapers and farm journals. The Information Office of the College and the Information Department of the Extension Service are cooperative in the course.

**418. Reporting of Public Affairs. (2-3). Credit 3. I**

This course will include study and practice in reporting crime, the courts, and governmental activities with emphasis on interpretation of these news areas. Prerequisite: Journalism 202.

**420. Law of the Press. (3-0). Credit 3. II**

This course will include a detailed study of the laws of publication and consideration of defamation, sedition, privilege, and ethics for the news media. It will include sections of study on general laws of the United States and on the individual states with emphasis on Texas. Prerequisite: Journalism 307, or approval of the Head of the Department.

**462. High School Journalism and Publications. (3-0). Credit 3. S** †

Problems of advising and sponsoring school newspapers and yearbooks; the school publication as a public relations tool; selecting and training the staff; financing school publications; planning content of high school journalism course. Prerequisites: Twelve semester hours of English; approval of Head of Department.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

Research problems related to the communications field. Individual work, fitted to the special needs of the specific student as determined by his interests and aptitude.

## Liberal Arts

**201. Survey of Music Literature. (1-2). Credit 2. I, II, S**

A study of various types and styles of music literature. Lectures supplemented by listening. Music illustrations selected primarily from standard concert repertoire. For the music listener with little or no formal training in music.

**301. Introduction to Philosophy. (3-0). Credit 3. I**

An introduction to the nature of philosophic inquiry; theories of reality and of knowledge; including idealism, naturalism, and pragmatism; the relation of philosophy to religion, science, history, politics, and education. The aim is to stimulate thinking about problems of conduct and to develop principles and methods of passing judgment on current social issues. Prerequisite: Junior classification.

**304. Philosophies of Life. (3-0). Credit 3. II**

A survey including the biographical and historical backgrounds of the philosophies of the major philosophical thinkers from Socrates to Russell, and of their influence upon the thinking of mankind; incidental consideration of the ideals and values involved in moral, religious, esthetic, and scientific points of view.

**311. Use of Library Resources. (0-2). Credit 1. I, II**

A course designed to develop in students skill in the use of library resources at the upper level. Emphasis placed on specialized reference tools. Prerequisites: Completion of sophomore English; junior classification.

## Department of Mathematics

Professor E. C. Klipple,
Professors R. E. Bayse, B. W. Brewer, J. T. Hurt, E. R. Keown, H. A. Luther; Associate Professors Dan Hall, J. T. Kent, W. S. McCulley, R. V. McGee, B. C. Moore, S. A. Sims, M. E. Tittle; Assistant Professors K. R. Bailey, J. R. Hillman, R. R. Lyle, H. D. Perry; Instructors O. L. Baugh, D. D. Davis, G. E. Fridel, J. E. Harris, L. M. Hovorak, R. A. Knapp, M. H. Merritt, C. B. Moehlman, N. W. Naugle, M. L. Williams

**101. Algebra. (3-0). Credit 3. I, II, S**

Factoring, fractions, linear equations in one unknown, graphs, systems of linear equations, exponents and radicals, quadratic equations.

**102. Algebra. (3-0). Credit 3. I, II, S**

Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

**103. Plane Trigonometry. (3-0). Credit 3. I, II, S**

Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, inverse trigonometric functions, trigonometric equations.

**104. Analytic Geometry. (3-0). Credit 3. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, transformation of coordinates, polar coordinates, parametric equations, plane, quadric surfaces. Prerequisite: Mathematics 103.

**110. Survey Course in Mathematics. (3-0). Credit 3. I, II, S**

Functions and graphs, derivatives of polynomials, integrals of polynomials, systems of equations, logarithms, progressions, binomial theorem, compound interest and annuities, permutations and combinations, probability. Prerequisite: Mathematics 102.

**116. Plane Trigonometry and Analytic Geometry. (4-0). Credit 4. I, II**
Trigonometric functions, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, functions and graphs; the straight line, circle, parabola, ellipse, hyperbola, polar coordinates, sketching of surfaces. Prerequisite: Mathematics 102. (For students registered in architecture.)

**121. Analytic Geometry and Calculus. (4-0). Credit 4. I, II, S**
Equation of a locus, locus of an equation, lines, circles, other conic sections, functions, limits, derivatives of polynomials and other algebraic functions, applications of differentiation, integration of polynomials, areas and volumes by integration. Prerequisites: Mathematics 102 and 103, or satisfactory performance on a qualifying examination.

**122. Calculus. (4-0). Credit 4. I, II, S**
Derivatives of transcendental functions; comprehensive study of integration; application of integration to moments, arc lengths, areas of surfaces of revolution, liquid pressure, and work; improper integrals; indeterminate forms. Prerequisite: Mathematics 121 or 209.

**209. Calculus. (3-0). Credit 3. I, II, S**
Variables, functions, and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Mathematics 104.

**210. Calculus. (3-0). Credit 3. I, II, S**
Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Mathematics 209.

**215. Finite Mathematics. (3-0). Credit 3. I, II**
Logic, theory of sets, Venn diagrams, partitions and counting, vectors and matrices, linear programming, theory of games, applications to behavioral science problems. Prerequisite: Mathematics 110.

**223. Differential and Integral Calculus. (4-0). Credit 4. I, II**
Limits, rate of change, the derivative, maxima and minima, differentiation of polynomials; the definite integral; volume, differentiation of implicit functions, special devices for integration, center of gravity, moment of inertia, double integrals. Prerequisite: Mathematics 116. (For students registered in architecture.)

**303. Theory of Equations. (3-0). Credit 3. I, II**
Complex numbers, remainder theorem, factor theorem, synthetic division, nature of roots of equation, ruler and compass construction, solution of cubic and quartic equations, isolation of a root, solution of numerical equations, determinants, matrices, systems of linear equations, symmetric functions, elimination, resultants, discriminants. Prerequisite: Mathematics 122 or 210.

**307. Calculus. (3-0). Credit 3. I, II, S** †
Introduction to series, Taylor's series, partial differentiation, elementary differential equations, applications. Prerequisite: Mathematics 122 or 210.

**308. Differential Equations. (3-0). Credit 3. I, II, S** †
Fourier series, linear equations, solution by Laplace transforms and by series, applications. Prerequisite: Mathematics 307.

**315. Introduction to Modern Algebra. (3-0). Credit 3. I, II, S**
Number theory and proof, integral domains, definitions and postulates, Euclidean algorithm, equivalence and congruence, Boolean algebra, groups, isomorphisms, rings and fields, matrices. Prerequisite: Mathematics 122 or 210 or 215.

**405. Vector Analysis. (3-0). Credit 3. I, II** †

Elementary operations, vector and scalar products of two vectors, vector and scalar products of three vectors, differentiation of vectors, the differential operators, applications to electrical theory, dynamics, mechanics, and hydrodynamics. Prerequisite: Mathematics 307.

**409. Advanced Calculus. (3-0). Credit 3. I, II, S** †

The concept of a function, limit of a sequence, continuity, theorems on continuous functions, the definite integral, the derivative, mean value theorems, hyperbolic functions, improper integrals. Prerequisite: Mathematics 307.

**410. Advanced Calculus. (3-0). Credit 3. II** †

Theory of plane curves, mechanics of a particle, Taylor's theorem and applications, numerical integration, convergence and divergence of series, power series, periodic functions, Fourier series. Prerequisite: Mathematics 409.

**411. Mathematical Probability. (3-0). Credit 3. I, II** †

Introductory concepts, permutations and combinations, elementary principles of the theory of probability, probability of experiment, distribution functions and continuous variables, averages, curve fitting, applications. Prerequisite: Mathematics 307.

**414. Mathematical Statistics. (3-0). Credit 3. I, II, S** †

History and terminology of statistics, probability theory, discrete and continuous distributions, expected values, moments, sampling, confidence intervals, tests of hypotheses. Prerequisite: Mathematics 307.

**415. Modern Algebra. (3-0). Credit 3. I, S**

Integers, rational numbers, real numbers, complex numbers. Groups, rings, integral domains, fields. Polynomials over a field. Prerequisite: Mathematics 307.

**416. Modern Algebra. (3-0). Credit 3. II**

Fundamental ideas in modern algebra centered around the basic concept of a group; the group concept; complexes and subgroups; groups of permutations; abelian groups. Prerequisite: Mathematics 415.

**417. Numerical Analysis. (3-3). Credit 4. I, II, S** †

Difference tables and applications, interpolation, numerical integration and differentiation, selected topics in Taylor's Series, orthogonal polynomials, error analysis, numerical solution of equations, elementary matrix theory, numerical solution of differential equations. The laboratory will consist of programming relevant problems on medium and high speed computers, and the operating of a medium speed computer. Prerequisite: Mathematics 308 or registration therein.

## FOR GRADUATES

**600. Fundamental Mathematics in Secondary Schools. (3-0). Credit 3. S**

Basic concepts of arithmetic, algebra, geometry, and trigonometry as viewed from the standpoint of higher analysis; famous problems; construction of tables and slide rules; other topics designed to help vitalize the teaching of high school mathematics. Prerequisite: Mathematics 122 or 210.

**601. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Surface integrals, line integrals, vector analysis, partial differential equations, elementary complex variables, applications. Prerequisite: Mathematics 308.

**602. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Fourier integrals, Bessel and Legendre functions, Laplace's equation, the diffusion equation, the wave equation, Green's functions. Prerequisite: Mathematics 601.

**606. Theory of Probability. (4-0). Credit 4. II**

Formulae for combinations and arrangements, problems in total and compound probability, expectation, risk, the problem of repeated trials, Stirling's formula, probability integral, theorems in mean value, dispersion, determination of best value, the law of error, the correlation coefficient, curve fitting. Prerequisite: Mathematics 411.

**607. Real Variables. (4-0). Credit 4. I**

Fundamental theory of number sets and point sets, elementary applications to real functions, theory of linear measure. Prerequisite: Mathematics 409.

**608. Real Variables. (4-0). Credit 4. II**

Measurable functions, the Riemann integral, the Lebesgue integral, applications to real functions and series. Prerequisite: Mathematics 607.

**609. Numerical Analysis. (3-3). Credit 4. I**

Linear programming, matrix calculations, Monte Carlo methods, theory of games. The laboratory will consist of programming the solution of appropriate problems on a high speed digital computer. Prerequisite: Mathematics 417.

**610. Numerical Methods in Differential Equations. (3-3). Credit 4. II**

Elementary numerical solutions, analytical foundations, systems of equations, higher order equations, two-point boundary problems, numerical methods for partial differential equations. The laboratory will consist of programming a high speed digital computer. Prerequisite: Mathematics 417.

**611. Ordinary Differential Equations. (4-0). Credit 4. I**

Definitions, general methods of solving first order differential equations, singular solutions, geometrical applications, trajectories, motions of a particle, special methods for the equation of the first order, linear equations of the second order, the method of successive approximations, systems of ordinary differential equations, interpolation and numerical integration, symbolic methods, numerical solution of differential equations. Prerequisite: Mathematics 308.

**612. Partial Differential Equations. (4-0). Credit 4. II**

General solution of first order partial differential equations, solution of second order equations from physics and mechanics by separation of variables, solution of second order equations by Green's functions. Prerequisite: Mathematics 611 or the equivalent.

**615. Vector Spaces and Matrices. (4-0). Credit 4. I**

Development of the fundamental properties of matrices by use of vector spaces and linear transformations. Prerequisite: Mathematics 409 or 415.

**616. Linear Transformations and Matrices. (4-0). Credit 4. II**

Development of canonical forms for matrices by use of transformations. Prerequisite: Mathematics 615.

**617. Complex Variables. (4-0). Credit 4. I, S**

Fundamental theory of analytic functions, conformal mapping, applications. Prerequisite: Mathematics 601.

**618. Complex Variables. (4-0). Credit 4. II**

The Schwarz-Christoffel theorem, infinite products, meromorphic functions, elliptic functions, special functions, applications. Prerequisite: Mathematics 617.

**620. Fourier Series and Allied Topics. (4-0). Credit 4. I**

Convergence of Fourier series, the cosine series, the sine series, uniform convergence of Fourier series, differentiation and integration of Fourier series, Fourier integrals, Bessel functions. Prerequisite: Mathematics 608.

**622. Laplace Transforms. (4-0). Credit 4. II, S**

Fundamental theorems concerning Laplace transforms. Applications to ordinary and partial differential equations, difference equations, and integral equations. Prerequisite: Mathematics 601.

**623. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. II**

Derivation and solution of the differential equations of chemistry and chemical engineering, mathematical theory of distillation, series solutions of differential equations, Bessel functions. Prerequisite: Mathematics 308.

**624. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. I**

Equations of finite differences, applications of partial differentiation, solution of partial differential equations, Fourier integrals, orthogonal systems, numerical and graphical methods, theory of errors. Prerequisite: Mathematics 623.

**625. Matrix Algebra and Tensor Calculus. (4-0). Credit 4. I, II, S**

Elementary matrix operations; linear transformations; canonical and modified triangular forms of matrices; inverse of a non-singular matrix; diagonal and rotation matrices; characteristic roots of a matrix; symmetric matrices; tensor concept; covariance and contravariance; algebra of tensors; metric tensors; Christoffel's symbols; covariant differentiation of tensors; applications. Prerequisite: Mathematics 405 or 601.

**627. Theory of Numbers. (3-0). Credit 3. I**

Ordered rings; the ring of integers; Euclidean rings; unique factorization; congruences; the Fermat-Euler Theorem; residues of powers; quadratic residues; the Legendre, Jacobi, and Kronecker symbols; quadratic reciprocity; diophantine equations; the series of primes; tests for primality. Prerequisite: Mathematics 409 or 415.

**628. Theory of Numbers. (3-0). Credit 3. II**

Commutative rings: ideals and residue class rings; principal ideal rings; unique factorization rings; quadratic fields; fields of higher degree. Prerequisite: Mathematics 627.

**633. Group Representations. (4-0). Credit 4. I**

This course introduces the basic properties of groups necessary for the study of group representations. Based on this foundation, the remainder of the course develops the theory of the representation of finite groups. The course content will be somewhat determined by the interest and preparation of the students. Prerequisites: Mathematics 415; approval of the instructor.

**641, 642. Modern Analysis. (4-0). Credit 4 each semester. I, II**

Recent developments in the theory of functions. Prerequisite: Mathematics 608.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable students to undertake and complete with credit limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Mathematics 601.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Mechanical Engineering

Professor C. M. Simmang,
Professors C. W. Crawford, E. S. Holdredge, L. S. O'Bannon, J. G. H. Thompson, W. I. Truettner, R. M. Wingren; Associate Professors J. H. Caddess, D. W. Fleming, R. H. Fletcher, A. M. Gaddis, R. H. Gibbs, W. S. Guthrie; Assistant Professors A. B. Alter, Earl Logan, Jr., T. A. Noyes, J. V. Perry, Jr., P. D. Weiner; Instructors P. M. Beckham, S. E. Brown, A. J. Edmondson, R. H. Gibson, E. D. Kranz, J. M. Nash*, H. G. Stallings, C. A. Whitehurst

**101. Engineering Problems. (0-3). Credit 1. I, II**

Use of the slide rule, dimensional equations, solution of problems involving various fields of engineering, trigonometry, and principles of motion. Logical thinking, neatness, and form stressed throughout. Prerequisites: Mathematics 101 or 102, and 103 or 116, or registration therein.

**105. Carpentry and Mill Work. (1-6). Credit 3. I, II**

This course is designed for freshman architectural students and for business administration freshmen taking building products marketing. The course includes simple building construction such as framing, roof construction, general carpentry work, exterior and interior finishing, forms, working drawings, and mill work including the use of machines, hand tools, safety, and built-in cabinet construction in the home.

**106. Cabinet Making. (1-6). Credit 3. II**

Design, rod making, construction, and finishing of furniture; glues, varnishes, lacquers, and other finishing materials; production methods; care and maintenance of woodworking machinery.

**201. Manufacturing Processes. (0-3). Credit 1. I, II**

Simple pattern layouts and construction of patterns; pattern storage; costs and weights of patterns and castings; kiln-drying and moisture content of pattern woods; the patternmaking industry. Cupolas; gas-fired furnaces, moulding sands; core-making; foundry layouts; and practice in moulding and casting both ferrous and non-ferrous metals. Welding materials and equipment, demonstration and practice in Heliarc, Atomic-hydrogen, metallic arc, electrical resistance, oxy-acetylene, and metallizing. Prerequisite: Engineering Graphics 105.

**202. Manufacturing Processes. (0-3). Credit 1. I, II**

A continuation of Mechanical Engineering 201, including advanced methods of patternmaking, moulding, and weld inspection and testing, fundamentals of joint design and metallography. Prerequisite: Mechanical Engineering 201.

**212. Engineering Mechanics. (3-0). Credit 3. I, II, S**

Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity, and moment of inertia. Prerequisites: Mathematics 122 or 210 or registration therein; Physics 218.

**220. Engineering Mechanics. (4-0). Credit 4. I**

The principles of mechanics as related to both statics and kinetics. A condensation of the material in Mechanical Engineeering 212 and 313. Prerequisites: Mathematics 122 or 210 or registration therein; Physics 218.

**309. Machine Production Techniques. (0-3). Credit 1. I, II, S**

Lecture demonstrations and practice in safety, care of machines and hand tools, shop organization, cutting speeds and feeds, standard machine tool work in metals, single point tool grinding, layout, drilling, tapping, shaping, turning, boring, threading, and milling. Prerequisite: Engineering Graphics 105.

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*On leave of absence from 9-1-61 to 8-31-62.

**310. Machine Production Techniques. (0-3). Credit 1. I, II, S**

A continuation of Mechanical Engineering 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures, and fixed gages. Prerequisite: Mechanical Engineering 309.

**313. Engineering Mechanics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 212, including kinematics, both graphical and algebraic solutions of relative linear velocities and accelerations, kinetics, dynamics of translation and rotation, work, energy, impact, momentum, and balancing. Prerequisite: Mechanical Engineering 212.

**323. Thermodynamics. (4-0). Credit 4. I, II, S**

The thermodynamics of ideal gases, including non-flow and steady-flow processes; internal combustion engines; gas compressors; combustion; vapors and vapor mixtures, boilers, and vapor cycles. Prerequisites: Mathematics 122 or 210; Physics 219.

**327. Thermodynamics. (3-0). Credit 3. I, II, S**

The thermodynamics of gases, vapors, and liquids in various non-flow and steady-flow processes; internal combustion engines; gas compressors; power plant equipment; closed and open systems of various types. Prerequisites: Mathematics 122 or 210; Physics 219.

**328. Thermodynamics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 327, covering gas mixtures, variable specific heats, turbines, modern power plant cycles, combustion, refrigeration, air conditioning, heat transfer. Prerequisite: Mechanical Engineering 323 or 327.

**329. Advanced Cabinet Making. (1-6). Credit 3. II**

Cabinet and furniture design, estimating, detailing, rod making construction and finishing. A major project is to be constructed from a set of drawings and details made by the student. A term paper is required on some related subject, such as design, finishing, safety, production methods, etc. Prerequisite: Mechanical Engineering 105 or 106, or equivalent experience.

**337. Kinematic Drawing. (0-3). Credit 1. I**

Problems and drafting involving linkages, centros, relative linear velocities, cams and gears. Designed especially to supplement the kinematics of motion included in the course of dynamics for industrial engineers. Prerequisite: Mechanical Engineering 313 or registration therein.

**338. Kinematics and Machine Design. (2-3). Credit 3. I, II, S**

A study of instantaneous centers, velocities, accelerations, cams, and an introduction to elementary machine design. Prerequisites: Civil Engineering 305 and Mechanical Engineering 313, or registration therein.

**340. Physical Metallurgy. (2-3). Credit 3. I, II, S** †

The fundamentals of the physical metallurgy of irons, steels, and their alloys; precipitation hardening and corrosion resistance of non-ferrous alloys; laboratory work in polishing, etching, and preparation of specimens, making and studying photomicrographs. Prerequisite: Civil Engineering 305.

**344. Fluid Mechanics. (3-0). Credit 3. I, II, S**

Application of the laws of statics, buoyancy, stability, energy, and momentum to the behavior of ideal and real fluids. A study of dimensional analysis and similitude and their application to flow through ducts and piping, dynamic lift and related problems. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**346. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. I, II**
The application of mechanics and thermodynamics to the behavior of ideal and real fluids. A study of the fundamental laws relating to heat flow. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**403. Engineering Laboratory. (1-3). Credit 2. I, II, S**
Study and calibration of instruments used in laboratory work and simple tests of engines, pumps, and flow devices. Engineering analysis and analogue theory are stressed. Calculations and written reports on the investigations and results obtained. Prerequisite: Mechanical Engineering 323 or 327 and registration in Mechanical Engineering 344 or Chemical Engineering 304.

**404. Engineering Laboratory. (1-3). Credit 2. I, II, S**
A continuation of Mechanical Engineering 403 with more advanced work in the analysis of steam and internal combustion engines, turbines, fans, refrigeration machinery, pumps, and various flow devices. Prerequisites: Mechanical Engineering 328, 344, 403.

**409. Structure and Properties of Alloys. (2-3). Credit 3. I**
This course gives a description of the fundamental properties of alloys. These alloys are the base on which most of present-day technology rests. Prerequisites: Chemistry 102 or 104; Mechanical Engineering 340; Physics 220.

**410. Internal Combustion Engines. (3-0). Credit 3. I, II** †
Thermodynamics of cycles for internal combustion engines and gas turbines, including fuels and combustion. Performance characteristics of various types of engines. Prerequisite: Mechanical Engineering 323 or 327.

**414. Steam and Gas Turbines. (3-0). Credit 3. I** †
Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; study of steam turbines and of special cycles. Prerequisites: Mechanical Engineering 328, 344.

**417. Power Engineering. (3-0). Credit 3. I, II, S**
The application, operation, and performance of all types of power plant equipment. The selection and arrangement of such equipment from the standpoint of economics. Prerequisites: Mechanical Engineering 328, 344, 461.

**420. Marine Engineering. (3-0). Credit 3. II**
Applications of power engineering to ship propulsion and to auxiliary machinery in merchant ships, including steering engines, electric generators, fresh water distillers, refrigeration plants, and devices for safe navigation. Elementary naval architecture, stability of ships under effects of weather, damage control, general aspects of nuclear propulsion plants and small boat engines are considered. Prerequisite: Mechanical Engineering 344 or 346.

**432. Automotive Engineering. (3-0). Credit 3. II**
The modern automobile, its power plant, fuels, performance, vibration, dynamic balancing, electrical equipment, braking systems, construction, etc., from an engineering standpoint. Prerequisites: Mechanical Engineering 313, and 323 or 327.

**436. Air Conditioning and Refrigeration. (3-0). Credit 3. II** †
Application of the principles of thermodynamics to equipment and methods of practical production of refrigeration. The thermodynamics of conditioning air. Selection of equipment, piping, and duct layouts for heating, ventilating, and air conditioning. Prerequisite: Mechanical Engineering 323 for non-mechanical engineering majors; 328 for mechanical engineering majors.

**445. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design, applied to various machine parts, such as columns, screws, shafts (considering combined stresses), bearings, brakes, springs, and complete machines. Prerequisites: Mechanical Engineering 310, 338, 340.

**446. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to problems encountered in transmission of power by means of belts, chains, and gears. Prerequisite: Mechanical Engineering 445 or registration therein.

**457. Engineering Analysis. (3-0). Credit 3. II** †

Mathematical and experimental methods of solving problems in the various fields of engineering. Dimensional analysis, representation and analysis of experimental data, graphical and numerical solution of differential equations, analogies and computers. Prerequisites: Mathematics 308; senior classification in engineering.

**459. Mechanical Vibration. (3-0). Credit 3. I, II, S** †

The basic theory of vibrating systems with single and multiple degrees of freedom and the principles of transmission and isolation of vibrations. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**461. Heat Transfer. (3-0). Credit 3. I, II, S** †

Study of conduction, convection, and radiation separately and in combination; steady and unsteady states; mathematical treatments; graphical and numerical solutions, dimensional analysis. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**481. Seminar. (0-2). Credit 1. I, II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of engineering and manufacturing processes. Lectures from industrial representatives. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

A continuation of Mechanical Engineering 481 but with more extensive reports and with lectures from visitors. Prerequisite: Senior classification.

**485. Advanced Problems in Mechanical Engineering. Credit 2 to 5. I, II, S** †

Special problems in the various phases of mechanical engineering are assigned to individual students or to groups. Readings are assigned, and frequent consultations are held. Prerequisites: By permission and senior classification in mechanical engineering.

## FOR GRADUATES

**601. Advanced Machine Design. (4-0). Credit 4. I**

A study of combined stresses and theories of failure, statically indeterminate structures, piping design, flat plates, curved beams, and the theory of lubrication. Prerequisites: Mathematics 308; Mechanical Engineering 445 or the equivalent.

**603. Power Plants. (2-6). Credit 4. II**

The design of central and isolated power plants with special attention to over-all economic operation. Prerequisite: Mechanical Engineering 417.

**605. Engineering Analysis. (4-0). Credit 4. I, S**

A study of analytical, graphical, and approximate methods of solving problems common to engineering; dimensional analysis and model study; design of experiments; statistical analysis and interpretation of test data including derivation of empirical equations. Prerequisite: Mathematics 308.

**613. Engineering Dynamics. (4-0). Credit 4. II**

A study of the dynamics of particles and of rigid bodies; the virtual work principle, Lagrange's and Euler's equations of motion, and Hamilton's principle applied to engineering problems. Prerequisite: Mathematics 308; Mechanical Engineering 313.

**615. Advanced Engineering Thermodynamics. (4-0). Credit 4. I**

The theories of thermodynamics and their application to the more involved problems in engineering practice. Prerequisite: Mechanical Engineering 328.

**616. Heat Transmission. (4-0). Credit 4. II**

The fundamental laws relating to heat flow, the application of these laws to engineering materials used in various industrial processes; a study of recent developments by reference to current literature. Prerequisites: Mathematics 601; Mechanical Engineering 605.

**617. Mechanical Vibrations. (4-0). Credit 4. I**

The theory of vibrations of machines and structures. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**618. Advanced Air Conditioning. (2-6). Credit 4. II**

Thermodynamics of air vapor mixtures applied to problems of air conditioning. Practice in design and selection of equipment with emphasis on the preparation of plans and specifications. Prerequisite: Mechanical Engineering 436.

**620. Experimental Stress Analysis. (3-3). Credit 4. I**

Study of photoelasticity, electric strain gauges, stresscoat, etc. Prerequisite: Mathematics 308 or registration therein.

**621. Fluid Mechanics. (4-0). Credit 4. I**

A study of flow problems encountered in the design of water, gas, and steam turbines; centrifugal and axial-flow pumps and compressors. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**640. Ferrous Metallurgical Design. (3-3). Credit 4. II**

A detailed study of the phase transformations in steel, the resulting changes in mechanical properties, the peculiarities of the steels, and their influence upon the design of machine elements. Prerequisite: Mechanical Engineering 340.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

The content will be adapted to the interest and needs of the group enrolled.

**691. Research. Credit 1 or more each semester. I, II, S**

Methods and practice in mechanical engineering research for thesis or dissertation.

**Structural Mechanics 601. Theory of Elasticity. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 602. Structural Stability. (4-0). Credit 4. II**

See Structural Mechanics for a full description of this course.

**Structural Mechanics 603. Theory of Plates and Shells. (4-0). Credit 4. I, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 605. Flow and Fracture of Solids. (4-0). Credit 4. II, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 606. Theory of Thermal Stresses. (4-0). Credit 4. II, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 608. Experimental Structural Analysis. (2-3). Credit 3. II, S**
See Structural Mechanics for a full description of this course.

**Structural Mechanics 609. History of Structural Mechanics. (2-0). Credit 2. II, S**
See Structural Mechanics for a full description of this course.

## Department of Military Science and Tactics

Frank L. Elder, Colonel, Infantry, USA
Professor of Military Science and Tactics

### UNITED STATES ARMY

Associate Professors: Lieutenant Colonels R. E. Byrns, T. A. Hotchkiss, J. H. Irving, H. A. Stuverud; Majors D. J. Chandler, R. M. Peach, W. H. Rhodes, L. L. Stevenson, A. E. Vernon; Assistant Professors: Captains W. W. Bell, S. J. Grant, Jr., C. E. Hall, Jr., W. T. Jessee, W. D. Old, II, W. T. Rife, Jr., H. M. Sanders, Jr.; Chief Warrant Officer H. A. Plaisance; Instructors: Sergeant Major W. R. Reese; Master Sergeants C. E. Gentry, C. E. McCollum, C. A. Pantalion, T. R. Tewell, I. E. Grant, H. H. Dayton, T. I. Hensley, G. E. Switzer, Jr., K. H. Truitt, J. W. Turnipseed; Sergeants First Class J. R. Brown, R. L. Dennis, D. A. Herring, H. W. Ferguson, E. V. Hetzel, E. J. McClure, K. W. Melson; Sergeant J. D. VanWagoner

### Basic Course of Military Science

**121. First Year Basic Military Science. (0-2). Credit 1. I**

*Theoretical: Organization of the Army and ROTC; individual weapons and marksmanship; United States Army and national security.

Practical: Leadership, drill and command, individual weapons and marksmanship.

**122. First Year Basic Military Science. (0-2). Credit 1. II**
A continuation of Military Science 121.

**221. Second Year Basic Military Science. (0-3). Credit 1. I**

Theoretical: American military history; map and aerial photograph reading; introduction to operations and basic tactics.

Practical: Leadership, drill and command.

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*Thirty contact hours of an acceptable academic subject will be substituted for a like number of military subject contact hours. (Normally this subject will be English 103.)

**222. Second Year Basic Military Science. (0-3). Credit 1. II**
A continuation of Military Science 221.

### Advanced Course of Military Science

**321. First Year Advanced Military Science. (2-2). Credit 3. I**
*Theoretical: Leadership; military teaching methods; branches of the army; small unit tactics and communication; pre-camp orientation.

Practical: Leadership, drill and command; tactics; military teaching methods.

**322. First Year Advanced Military Science. (2-2). Credit 3. II**
A continuation of Military Science 321.

**421. Second Year Advanced Military Science. (2-2). Credit 3. I**
*Theoretical: Operations; logistics; Army administration; military law; service orientation; role of the United States in world affairs.

Practical: Leadership, drill and command.

**422. Second Year Advanced Military Science. (2-2). Credit 3. II**
A continuation of Military Science 421.

## Department of Modern Languages

Professor J. J. Woolket,
Professor J. A. Dabbs; Associate Professors E. C. Breitenkamp,
J. M. Skrivanek; Instructors J. D. Deliz, C. E. Evans,
M. E. Gottschalk, M. C. Quinn, E. S. Wells

Foreign languages, in addition to their unquestioned cultural value, have a utilitarian value of great importance for those expecting to engage in research or purely practical pursuits. It is, therefore, advisable, when possible, for students to take up such a language during their undergraduate studies and thereby have the use of it when they begin advanced work in agriculture, engineering, or in pure science. Otherwise, as often happens, their specialization may be hampered or delayed. A language laboratory is available for those interested in developing a command of the spoken language.

**100. Spoken English for Foreign Students. (3-0). Credit 3. S**
Instruction in American-English pronunciation; intensive class drill; individual laboratory work in comprehension and practice in correct pronunciation by means of tape recordings; study of idiomatic and colloquial expressions; orientation in the American way of life and in university procedure.

**101. Beginning French. (3-0). Credit 3. I**
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**102. Beginning French. (3-0). Credit 3. II**
Continuation of Modern Language 101 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice. Prerequisite: Modern Language 101 or equivalent.

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*In both the first and second years of Advanced Military Science, 45 contact hours of an acceptable academic subject are substituted for a like number of military subject contact hours. Since the academic subject substituted depends on the individual cadet's academic major, the Military Science Department will assign such subject to the cadet at time of registration.

**103. Beginning German. (3-0). Credit 3. I, II**

Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**104. Beginning German. (3-0). Credit 3. I, II, S**

Continuation of Modern Language 103 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice. Prerequisite: Modern Language 103 or equivalent.

**105. Beginning Spanish. (3-0). Credit 3. I, II, S**

For students who have had no previous training in Spanish. Study of standard elementary grammar with oral and reading exercises; early attention given to background for conversation. One half of class preparation will be done in language laboratory. On completion of course the student should have a 500-word active vocabulary; he should be capable of simple conversation.

**106. Beginning Spanish. (3-0). Credit 3. I, II, S**

Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course, the student should have an active vocabulary of 900 words and passive vocabulary of about 1300. Part of preparation will be done in language laboratory. Prerequisite: Modern Language 105 or equivalent.

**109. Beginning Russian. (3-0). Credit 3. I**

Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. Language laboratory available for collateral training.

**110. Beginning Russian. (3-0). Credit 3. II**

Continuation of Modern Language 109; continued study of elements of grammar; oral exercises designed to develop conversational ability; continued use of oral-aural laboratory equipment. Prerequisite: Modern Language 109 or equivalent.

**201. Intermediate French. (3-0). Credit 3. I**

Introduction to French readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 102 or equivalent.

**202. Intermediate French. (3-0). Credit 3. II**

Continuation of Modern Language 201 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 201 or equivalent.

**203. Intermediate German. (3-0). Credit 3. I**

Introduction to German readings of average difficulty, principally through short stories and selections from longer works. Review of grammar, composition; practice in conversation. Prerequisite: Modern Language 104 or equivalent.

**204. Intermediate German. (3-0). Credit 3. II**

Continuation of Modern Language 203 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 203 or equivalent.

**205. Intermediate Spanish. (3-0). Credit 3. I, II**

Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Language laboratory available for collateral training. Prerequisite: Modern Language 106 or two years of high school Spanish.

**206. Intermediate Spanish. (3-0). Credit 3. I, II**

Continuation of Modern Language 205. Reading of standard literary works on the 2,000-word level. Extensive written and oral work, translation and original, aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text. Prerequisite: Modern Language 205 or equivalent.

**209. Intermediate Russian. (3-0). Credit 3. I**

Review of grammar; selected readings based on everyday subjects; supplementary material to develop self-expression and recognition ability. Prerequisite: Modern Language 110 or two admission units in Russian.

**210. Intermediate Russian. (3-0). Credit 3. II**

Continuation of Modern Language 209. Readings are taken from such works as Lermontov's great novel **Hero of Our Time**, Pushkin's **Stationmaster**, and short stories from Turgenev's well known **A Sportsman's Sketches.** Prerequisite: Modern Language 209 or equivalent.

**303. Classical German Literature. (3-0). Credit 3. I**

A study of the classical period of German literature. Reading and analysis of selected works of Lessing, Schiller, and Goethe. Reports and term papers on collateral reading. Prerequisite: Modern Language 204 or approval of the Head of the Department.

**304. Twentieth Century German Literature. (3-0). Credit 3. II**

A study of twentieth century German literature. Reading and analysis of selected works by representative naturalistic, impressionistic, and expressionistic writers. Reports and term papers on collateral reading. Prerequisite: Modern Language 204 or approval of the Head of the Department.

**305. Modern Spanish-American Drama. (3-0). Credit 3. I**

A study of representative plays by such Spanish-American dramatists as Florencio Sanchez, Martinez Cuitiño, Bustillo Oro, Rodolfo Usigli, and others. (The dramatists studied will vary depending on their contribution to the Spanish-American theater.) An effort is made to obtain an understanding of the economic, social, and cultural background of the Spanish-American republics. The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. A part of the class preparation will be done in the laboratory. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**306. Modern Spanish-American Drama. (3-0). Credit 3. II**

Continuation of Modern Language 305. However, the authors and plays studied will differ from those offered in Modern Language 305. A part of the class preparation will be done in the laboratory. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**309. Advanced Russian. (3-0). Credit 3. I**

Reading of selections from Russian literature and technical and scientific publications. Special attention to participial construction and translation of complex sentences. Conversation practice. Laboratory available for oral preparation, comprehension drill, and vocabulary-building exercises. Prerequisite: Modern Language 210 or approval of Head of Department.

**310. Advanced Russian. (3-0). Credit 3. II**
Continuation of Modern Language 309. Class reading of wide variety of selections from current literary, journalistic, and scientific periodicals. Partly conducted in Russian. Outside reading in selected fields of individual interest. Laboratory available for advanced conversation and comprehension drill. Prerequisite: Modern Language 309 or approval of Head of Department.

**325. Public Speaking in Spanish. (1-2). Credit 2. I**
Training in the preparation and delivery of talks in Spanish. Students are required to prepare and deliver a three-minute talk in Spanish once a week, and to conduct a question-answer period of three minutes on their talk. These talks are based on subjects dealing with the student's professional field and on those dealing with Spanish-America. The talks are recorded for remedial work in the laboratory. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**326. Public Speaking in Spanish. (1-2). Credit 2. II**
Continuation of Modern Language 325 with round-table discussions and impromptu speeches. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**335. Spanish-American Novel. (3-0). Credit 3. I**
A study of the most important works of some distinguished contemporary Spanish-American novelists. (The list will vary but will be chosen from such writers as Güiraldes, Azuela, Gallegos, Lopez y Fuentes, Guzman, Pietri, etc.) The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. A part of the class preparation will be done in the laboratory. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**336. Spanish-American Novel. (3-0). Credit 3. II**
Continuation of Modern Language 335. However, the authors and novels studied will differ from those offered in Modern Language 335. A part of the class preparation will be done in the laboratory. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**385. Readings in French. Credit 1 or 2. I, II**
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of French; junior classification; approval of Head of Department.

**386. Readings in German. Credit 1 or 2. I, II**
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of German; junior classification; approval of Head of Department.

**388. Readings in Russian. Credit 1 or 2. I, II**
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Twelve hours of Russian; approval of Head of Department.

**401. Introduction to Scientific French. (3-0). Credit 3. S**
This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**402. Readings in Scientific French. (1-2). Credit 2. S**

Continuation of Modern Language 401. The student will select and translate material in his major field written in French. Accuracy and skill are developed through personal conferences and checking the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 401 or approval of the Head of the Department.

**403. Introduction to Scientific German. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**404. Readings in Scientific German. (1-2). Credit 2. S**

Continuation of Modern Language 403. The student will select and translate material in his major field written in German. Accuracy and skill are developed through personal conferences and checking of the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 403 or approval of the Head of the Department.

## Department of Nuclear Engineering

Professor R. G. Cochran;
Associate Professor R. A. Axford; Assistant Professor J. D. Randall;
Instructor J. V. Walker

**401. Nuclear Engineering. (3-0). Credit 3. I** †

A non-rigorous treatment of the various elements of nuclear engineering. This course is especially offered for students not electing to pursue advanced study in this field. Prerequisites: Mathematics 122 or 210; Physics 219; senior classification.

**402. Industrial Applications of Radioisotopes. (3-0). Credit 3. II** †

The properties of radioactive nuclei and the interactions of radiation with matter are discussed. The behavior of radiation detection devices is covered. The properties of radioisotopes that lend themselves to industrial usage are presented and the individual applications are evaluated. Prerequisites: Mathematics 308; senior classification.

**409. Radiological Safety. (2-0). Credit 2. I, II, S** †

Lectures and demonstrations concerning the interactions of nuclear radiations with matter and especially with biological systems. Special emphasis will be given to the theory and practice of radiation dosimetry as applied to radiation protection. Discussion of biological and physical bases for radiation safety standards. Prerequisites: Mathematics 307; Physics 220; or approval of the instructor.

### FOR GRADUATES

**601. Nuclear Reactor Analysis. (4-0). Credit 4. I**

Nuclear transformations in fission reactors. Neutron cross-sections and resonance reactions. The neutron balance and cycle. Neutron slowing-down and diffusion. Fermi age and multigroup criticality for bare, homogeneous cores. Reflected homogeneous and heterogeneous reactors. Reactor kinetics including the inhour equation, source multiplication in sub-critical reactors and fission product poisoning. Prerequisites: Mathematics 308, 601 or registration therein.

**602. Nuclear Reactor Analysis. (4-0). Credit 4. II**

Introductory transport theory with emphasis on the limitations of diffusion and age theory. Multigroup slowing-down diffusion theory for bare and reflected cores. Thermal utilization, resonance escape, fast fission, homogenization and anisotropies in heterogeneous lattices. Temperature coefficients. Control rods. Reactor kinetics with and without temperature feedback. Perturbation theory for thermal reactors. Prerequisites: Mathematics 601; Nuclear Engineering 601.

**605. Nuclear Measurements Laboratory. (2-3). Credit 3. I**

The basic techniques of nuclear measurements are discussed and practiced. The behavior of neutrons in multiplying and non-multiplying media is observed. Extensive use is made of the nuclear reactor. Prerequisite: Nuclear Engineering 601 or registration therein.

**606. Reactor Experimentation. (2-3). Credit 3. II**

The techniques of Nuclear Engineering 605 are utilized in measuring the properties of a nuclear reactor. Control rod and power calibrations are performed. The effects of scattering, absorption, and moderation on the reactor are determined. The reactor core is disassembled and a critical experiment performed. Prerequisites: Nuclear Engineering 602 or registration therein, 605.

**608. Thermonuclear Engineering. (3-0). Credit 3. II**

Fundamentals relative to the use of the fusion reaction as an energy source. Charged particle reactions. Reaction rates. Radiation losses. Transport theory for ionized gases. Liouville and Boltzmann equations. Macroscopic conservation laws and magnetohydrodynamics. Propagation of small amplitude waves. Instabilities. Confinement and heating problems. Diagnostics.

**610. Design of Nuclear Reactors. (3-0). Credit 3. II**

This course applies the fundamentals of nuclear physics and reactor theory with engineering fundamentals to the design of nuclear reactors. Prerequisites: Nuclear Engineering 601, 602 or registration therein.

**615. Nuclear Radiation Detection. (3-0). Credit 3. I**

The interaction of radiation with matter and the behavior of ion pairs in the presence of electric fields are discussed. The theory of operation is presented for the following radiation detection devices: ion chambers, proportional and G-M counters, scintillation detectors, Cerenkov counters, emulsions, cloud chambers, bubble chambers, and activation detectors. Prerequisite: Mathematics 307.

**618. Nuclear Control Systems. (3-0). Credit 3. II**

The fundamentals of servocontrol are developed and applied to a nuclear reactor. The safety aspects of reactor control and operational problems are discussed. Prerequisites: Nuclear Engineering 601, 602 or registration therein.

**621. Nuclear Metallurgy. (3-0). Credit 3. II**

The physical and metallurgical properties of metals used in nuclear reactors and the reasons for their use are considered. Prerequisite: Mechanical Engineering 409.

**622. Nuclear Power Plant Design and Analysis. (3-0). Credit 3. II**

This course is designed to present the application of nuclear reactor systems to the field of power production, utilizing the general fields of thermodynamics and heat transfer, along with special problems arising from a nuclear system. Prerequisites: Mechanical Engineeering 323 or 328; Nuclear Engineering 601.

**623. Analytical Nuclear Engineering I. (3-0). Credit 3. I**

Unified analytical treatment of heat conduction in solids and thermal stress phenomena with application to nuclear energy sources. General and specialized formulations and methods of solution for predicting the response of solids to simultaneous thermal and external loads. Transient heat conduction in solids. Isothermal elasticity. Thermoelasticity. Viscoelasticity. Plasticity. Prerequisites: Mathematics 622 or 625; Nuclear Engineering 610; approval of the instructor.

**624. Analytical Nuclear Engineering II. (3-0). Credit 3. II**

Unified treatment of mass, momentum, and energy transport with applications to nuclear energy sources. Transport coefficients. General and specialized formulations of mass, momentum, and energy balances. Potential, Newtonian, and non-Newtonian flows. Velocity and temperature distributions in laminar and turbulent flow. Liquid metal heat transfer. Flow and thermal stability. Prerequisite: Nuclear Engineering 623.

**625. Nuclear Reactor Theory. (4-0). Credit 4. I**

Advanced treatment of neutron transport with and without spectrum regeneration. Integrodifferential and integral Boltzmann equations and their adjoints. Methods of solution including exact, complete set representations, integral transforms and numerical quadrature. Multigroup diffusion and transport theory. Spatially dependent and independent kinetics. Perturbation theory for steady-state and transient phenomena. Prerequisites: Mathematics 602 or 617; Nuclear Engineering 602.

**626. Nuclear Reactor Theory. (4-0). Credit 4. II**

Continuation of Nuclear Engineering 625. Variational principles for discrete and continuous eigenvalues with applications to problems with and without spectrum regeneration. Milne problem and the Wiener-Hopf technique. Serber-Wilson and Feynman methods. Spatially independent and dependent slowing-down theory. Neutron thermalization in light and heavy elements. Prerequisite: Nuclear Engineering 625.

**681. Seminar. (1-0). Credit 1. I, II**

Special topics in nuclear engineering which are not covered by formal course work. Whenever possible, guest lecturers will discuss topics which they have personally investigated. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II**

This course is offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Oceanography and Meteorology

Professor D. F. Leipper,
Professors D. W. Hood, H. J. McLellan, V. E. Moyer, R. O. Reid, B. W. Wilson*;
Associate Professors W. H. Clayton, G. A. Franceschini, L. S. Kornicker,
A. H. Thompson; Assistant Professors K. C. Brundidge, R. A. Clark, J. D.
Cochrane, S. Z. El-Sayed, W. K. Henry, S. M. Ray, T. E. Sanford;
Instructors J. E. Arnold, S. J. Hall, E. R. Ibert

### METEOROLOGY

**317. Meteorological Instruments, Observations, and Communications. (2-3). Credit 3. I, II**

Theory, design, and accuracy of standard meteorological instruments; surface weather observations; weather codes and symbols; global and local weather networks; methods and forms of data transmissions; data presentation and elementary data analysis. Prerequisites: Mathematics 121 or 209; Physics 202 or 219.

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*On leave of absence from 4-1-61 to 3-31-62.

**318. Meteorological Instruments, Observations, and Communications. (1-3). Credit 2. I, II**

Methods and instruments for aerological observation, including the theory and limitations of pilot balloon, radiosonde, rawin, and radar observations; computation, coding, and plotting of data. Forms of data representation; meteorological charts and diagrams; techniques of data analysis. Prerequisite: Meteorology 335.

**325. Physical Climatology. (3-0). Credit 3. I, II**

The horizontal, vertical, and seasonal distributions of meteorological elements in their relation to such basic controls as solar and terrestrial radiation, physiography, rotation of the earth, the general circulation, air mass exchange, and various atmospheric processes. Prerequisite: Physics 202 or 219.

**326. Regional Climatology. (2-0). Credit 2. II, S**

The broader climatic regimes of the earth and the physical basis for their differences; tropical and polar climatology; local climates; introduction to microclimatology. Prerequisite: Meteorology 325.

**335. Atmospheric Statics and Thermodynamics. (3-0). Credit 3. I, II**

Geopotential; chemical composition of the atmosphere; the physical variables; the hydrostatic equation; hypsometry; thermodynamics of dry, moist, and saturated air; mixing and convection; thermodynamic charts and diagrams; thermodynamics applied to atmospheric analysis and weather processes. Prerequisites: Mathematics 122 or 210; Physics 202 or 219.

**336. Atmospheric Motions. (3-3). Credit 4. I, II**

Kinematics; conservation equations; equations of motion; geostrophic and accelerated motions; steamlines; trajectories; circulation and vorticity theorem; dynamics of wind systems. Prerequisites: Mathematics 307; Meteorology 335.

**445. Atmospheric Physical Processes. (3-0). Credit 3. I, II, S** †

The physics of heat, moisture and momentum transfer in the atmosphere; radiation, evaporation, condensation, advection, convection, turbulence, and diffusion; their consequences upon the weather. Prerequisite: Meteorology 336.

**457. Fundamentals of Weather Analysis. (1-12). Credit 5. I, II, S**

Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies of the structure and motions of air currents, fronts, cyclones, anticyclones, pressure waves, tropical storms, and other features of the circulation. Prerequisites: Meteorology 318, 336.

**458. Weather Analysis. (1-12). Credit 5. I, II, S** †

A continuation of Meteorology 457, but with the emphasis on motions of wind and weather patterns and on weather sequence. Introduction to principles and methods of prognosis. Prerequisites: Meteorology 445, 457.

**465. Agricultural Meteorology. (2-0). Credit 2. II** †

Study of principles of meteorology as they are related to agriculture, with special emphasis upon the climate of the surface layers of the atmosphere. Prerequisite: Approval of the instructor.

## FOR GRADUATES

**600. Survey of Meteorology and Oceanography. (3-0). Credit 3. S**

A survey course in meteorology and oceanography designed for teachers of secondary school science. Prerequisite: Approval of Heads of Departments of Oceanography and Meteorology and of Education and Psychology.

**636. Dynamic Meteorology. (3-0). Credit 3. II**

A formal treatment of the principles of fluid dynamics as they apply to the atmosphere; the Navier-Stokes equations; perturbation theory, energy equations and transformations, vorticity, barotropic and baroclinic systems, cyclone theories, and numerical weather prediction. Prerequisites: Mathematics 601; Meteorology 336; or the equivalent.

**646. Atmospheric Physics. (3-0). Credit 3. I, S**

Fog, cloud, and precipitation physics; thunderstorms; atmospheric electricity; optical and acoustical phenomena. Prerequisite: Meteorology 445.

**647. Meteorology of the Upper Atmosphere. (3-0). Credit 3. I**

Study of the composition, structure, and characteristic phenomena of the extratropospheric terrestrial atmosphere based on balloon, rocket, artificial satellite, and various indirect measurements. Prerequisite: Bachelor of Science degree in science or engineering.

**648. Cosmic Meteorology. (3-0). Credit 3. II**

Continuation of Meteorology 647. Examination of the properties and processes of the interplanetary plasma and of the atmospheres of the other planets; composition, structure, clouds, and circulations, and their implications in terrestrial meteorology. Prerequisite: Meteorology 647.

**658. Weather Analysis. (2-6). Credit 4. II**

Discussion, application, and critical evaluation of methods employed by American and foreign centers for analyzing and forecasting circulation and weather patterns over periods up to 3 days; objective analysis and numerical predictions; recent developments; techniques for analysis of specific weather patterns. Prerequisites: Meteorology 457 or the equivalent; approval of Head of Department.

**665. Micrometeorology. (3-0). Credit 3. II**

A study of the physical processes occurring at the interface between earth and atmosphere, with special emphases upon evaporation, turbulent diffusion of gases, variations in wind, temperature, and humidity in the lowest few meters of the atmosphere. Prerequisites: Mathematics 308; Meteorology 445; Physics 301.

**675. Radar Meteorology. (3-0). Credit 3. I, II**

Study of the theory and practice of radar storm observations. Prerequisites: Meteorology 445, 457.

**676. Hydrometeorology. (3-0). Credit 3. II**

The role of weather and weather processes in land water problems. Prerequisite: Meteorology 326 or approval of the instructor.

**679. Military Applications of Meteorology. (3-0). Credit 3. I**

Applications of meteorological knowledge and data to related activities and problems in the national defense not under security classification. Prerequisite: Meteorology 457.

**681. Seminar. (2-0). Credit 2. II**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## OCEANOGRAPHY

**201. Sea and Air Sciences. (1-0). Credit 1. I, II, S**

Oceanography and meteorology as scientific career fields. Features of the natural environment which affect man's daily life and activities. A survey course open to all college students.

**401. Introduction to Oceanography. (3-0). Credit 3. I, II, S** †

The various aspects of oceanography with emphasis upon those pertinent in the Gulf of Mexico. The principles upon which the disciplines of the subject are based. The unity of the marine sciences and their importance to man. The relations between oceanography and the fields of biology, chemistry, engineering, geography, geology, mathematics, meteorology, and physics. Opportunities in oceanography. Prerequisite: Senior classification in engineering or in a biological or physical science or the approval of the instructor.

### FOR GRADUATES

**601. Research Methods in Oceanography. (1-0). Credit 1. I, II, S**

Selection of a research problem for thesis work; planning the program of investigation. Prerequisites: General prerequisites for oceanography.

**603. Sea Laboratory Techniques. (0-6). Credit 2. S**

Practice in techniques used regularly aboard ship and in collecting field data. Cruise planning, navigational methods, collection of hydrographic, bathymetric and meteorological data, sediment sampling, biological sampling, and the collection of water samples for chemical analysis will be stressed. Prerequisites: General prerequisites for oceanography.

**610. Physical Oceanography. (3-0). Credit 3. I, II**

Survey of the physics of the sea; physical properties, transmission of light and sound in the sea, sea ice; heat budget of the sea and transformation of energy within the sea and at the boundaries; evaporation from the sea, description of water masses and their origin; the horizontal and vertical circulation of the seas; the applied dynamic and kinematic formulas for circulation in the sea; the concept of dynamic equilibrium of the different concentrations within the sea; introduction to waves and tides of the sea. Prerequisites: General prerequisites for oceanography.

**611. Theoretical Physical Oceanography. (3-0). Credit 3. II**

Theoretical and quantitative aspects; equations of motion; equation of continuity; boundary conditions; distribution of properties in the presence of diffusion; heat budget; stability; dynamics and computation of ocean currents; wind currents; turbulence; friction. Prerequisites: Mathematics 601 or registration therein; Oceanography 610.

**612. Theory of Ocean Waves. (3-0). Credit 3. II**

Theory of simple harmonic surface waves; wave groups and group velocity, wave energy and energy propagation, dispersion. Theory of generation and decay of surface waves. Waves of large steepness, including solitary and cnoidal waves. Modification of waves in shallow water, refraction; wave ray analysis and the phase diagram. Capillary waves; internal waves and shear waves. Prerequisites: Mathematics 308; Oceanography 610.

**613. Engineering Aspects of Oceanography. (3-0). Credit 3. I**

Applications of oceanographic knowledge in engineering. Sea disturbances, astronomical tides, seismic sea waves, seiches, surging in harbors, wind generation of ocean waves. Practical wave forecasting; wave refraction diagram analysis; propagation of waves in shallow water, breaking waves. Principles of similitude, fluid resistance, wave forces on fixed and floating structures. Sediment movement; coastal erosion and stabilization. Harbor location and design; breakwater, and dike construction. Prerequisites: Mathematics 308; Oceanography 610.

**614. Dynamics of the Ocean and Atmosphere. (3-0). Credit 3. I**

Advanced theory of the ocean dynamics, a comparison of of the hydrodynamic and thermodynamic character of the ocean and the atmosphere; the mutual dependence of the dynamics and thermodynamics of the sea on those of the air and vice versa; some special theories from the mean equations of motion, gradient wind, jet stream, mutual adjustment of the mass field and velocity field in the sea; mutually coupled temperature variations of the sea and the air; wind driven currents; the general hydrodynamic problem of the ocean and of the atmosphere, and an investigation of its uniqueness; the maintenance of the general circulation. Prerequisites: Mathematics 602; Oceanography 611. (Offered in 1961-62 and in alternate years thereafter.)

**620. Biological Oceanography. (3-0). Credit 3. II**

Critical study of important contributions defining major biological divisions, provinces, and life zones of the oceans; effects of climate, chemical, and physical barriers, and phylogeny on zoogeography; factors relating to population cycles; productivity problems; ecological inter-relationships of major groups of plants and animals in the sea. Prerequisites: General prerequisites for oceanography.

**621. Biological Oceanography of the Gulf of Mexico. (1-6). Credit 3. I**

Detailed examination of selected aspects of biological oceanography which are of major importance to the Gulf of Mexico. Prerequisites: Oceanography 620, undergraduate major in biology, or approval of instructor.

**630. Geological Oceanography. (3-0). Credit 3. II**

Topography and characteristic features of the ocean bottoms; marine shorelines and processes operating in the coastal zone; nature of marine sediments; marine transportation and deposition of sedimentary materials; erosion of beaches. Prerequisites: General prerequisites for oceanography.

**631. Geological Oceanography of the Gulf of Mexico. (2-3). Credit 3. I**

Topography, stratigraphy, paleontology, and environments of the Gulf; littoral region and adjacent plains; forces acting on shorelines and bottoms; depositional surfaces, equilibria, equilibrium structures; tectonics; pleistocene history of region. Field trips. Prerequisite: Undergraduate major in geology.

**640. Chemical Oceanography. (3-0). Credit 3. II**

The chemical composition and properties of sea water; the definition and calculation of salinity; the pH, excess base, and carbon dioxide system in the sea; nutrients, their cycles and their distribution; oxygen and other dissolved gases; chemistry of sedimentation; composition of organisms and organic constituents of sea water; marine corrosion; extraction of raw materials from the sea. Prerequisites: General prerequisites for oceanography.

**641. Chemical Oceanography. (3-0). Credit 3. I**

Detailed study of selected topics in chemical oceanography which pertain to the Gulf of Mexico; industrial utilization of sea water and chemical products obtained from marine plants and animals; water freshening; industrial corrosion problems; chemical aspects of photosynthesis and fertility of the sea; chemistry of estuarine waters. Prerequisites: Oceanography 640; undergraduate major in chemistry; approval of the instructor.

**642. Laboratory Techniques in Oceanography. (0-6). Credit 2. I**

Detailed study will be made of methods of preparation and analysis of samples for biological, chemical, and geological investigations. The methods of analysis will concern oxygen, phosphate, silicate, nitrate, nitrite, salinity, carbon, sediment particle size, mineralogy, organic production, and others. Prerequisites: Oceanography 603, 610, 620, 630, 640, or approval of the instructor.

**643. Geochemistry of the Ocean. (3-0). Credit 3. I**

Geochemistry of the oceanic hydrosphere, biosphere, and lithosphere; how these are related to the atmosphere; study of the elements within them. Prerequisites: Oceanography 630, 640, and 641 or graduate classification in geology. (Offered in 1961-62 and in alternate years thereafter.)

**644. Geochemistry of the Ocean. (3-0). Credit 3. II**

A detailed critical study of the geochemistry of sedimentation, the geochemical evolution of the ocean, the biogeochemistry of calcium carbonate and isotope geochemistry as related to the ocean. Prerequisite: Oceanography 643.

**651. Meteorological Oceanography. (1-3). Credit 2. I**

The use of the conservative characteristics of the sea in forecasting meteorological and oceanographic phenomena. Calculation of ocean waves and swell, transformation of waves in shallow water, statistical summaries, modification of air masses in contact with the ocean, forecasting of fog and squalls, effect of the oceans upon climate of the world, meteorological tides. Prerequisite: Oceanography 610.

**652. Boundary Layer Problems. (3-0). Credit 3. I**

Theory of radiative exchange of energy at the sea surface; the theory of turbulent flow over hydrodynamically rough and smooth surfaces with application to the evaluation of the fluid frictional stresses at the boundaries of the sea, the evaluation of wind stress, evaporation, etc.; the micro-structure of temperature and salinity near the ocean surface; evaluation of turbulent exchange coefficients. Prerequisite: Oceanography 611. (Offered in 1962-63 and in alternate years thereafter).

**681. Seminar. (2-0). Credit 2. I**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in oceanography to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum. An example of the solution of a special problem in oceanography would be the work done in analyzing a special set of data collected on a cruise at sea. The course may also consist of a special series of problem discussions not given periodically, such as those offered by visiting scientists. Prerequisites: Oceanography 610, 630, 640.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## Department of Petroleum Engineering

Professor R. L. Whiting,
Professors J. W. Amyx, J. C. Calhoun, Jr., P. B. Crawford, H. T. Kennedy;
Associate Professor J. R. Pedigo

**300. Petroleum Engineering Field Problems. (1-6). Credit 3. S**

A field study of the problems encountered in oil and gas fields. Course consists primarily of visits to oil and gas fields. The requirements of this course will not permit a student to take any other course at the same time. Prerequisite: Completion of junior petroleum engineering courses.

NOTE: This course may be taken in place of field work as required of all graduates in petroleum engineering. Field work or this course required before registration in any of the senior or fifth year petroleum engineering courses.

**305. Petroleum Development. (2-0). Credit 2. I**

Principles of oil field development, rotary and cable tool drilling methods, drilling fluids, oil field hydrology. Prerequisites: Geology 201, 207; Mathematics 307; Physics 219.

**306. Reservoir Rock Properties. (2-0). Credit 2. II**

A systematic study of the physical properties of petroleum reservoir rocks with particular emphasis on porosity, permeability, relative permeability, capillary characteristics, homogeneous and heterogeneous rock systems. Prerequisites: Petroleum Engineering 305, 307.

**307. Petroleum Development Laboratory. (0-3). Credit 1. I**

Properties of petroleum; operation of rotary drilling rig; well surveying practices; tests on drilling fluids and cements. Prerequisite: Petroleum Engineering 305 or registration therein.

**308. Rock and Fluid Properties Laboratory. (0-3). Credit 1. II**

Core analysis, capillary pressure and relative permeability tests, fluid displacement tests; differential and flash vaporization tests of gas saturated crude oil at elevated pressure and temperature. Prerequisites: Petroleum Engineering 306, 310, or registration therein.

**310. Reservoir Fluids. (3-0). Credit 3. II**

Thermodynamic behavior of natural occurring hydrocarbon mixtures. Evaluation and correlation of physical properties of petroleum reservoir fluids, laboratory and empirical methods. Prerequisites: Chemistry 323; Petroleum Engineering 305, 307.

**312. Well Logging. (1-0). Credit 1. II**

A preliminary study of logging methods with particular attention to electric logging and radioactive logging as they would be applied in the petroleum industry. Prerequisite: Geology 210.

**402. Petroleum Property Management. (3-0). Credit 3. II** †

Factors which influence the value of oil and gas properties; preparation of valuation reports, cost data, operating organization, regulation of petroleum production. Prerequisites: Petroleum Engineering 409, 413, 428.

**405. Drilling and Production Design. (2-2). Credit 3. I** †

A study of the selection of drilling and production equipment used in oil field practice. Design of drilling and production systems. Prerequisites: Civil Engineering 305; Petroleum Engineering 305, 306, 307, 308, 310, 312.

**409. Subsurface Engineering. (1-3). Credit 2. I** †

Well logging, contour maps, isopachous maps, and the determination of the size, shape, and volume content of petroleum reservoirs. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**413. Petroleum Measurement and Transportation. (2-2). Credit 3. I** †

Theory and methods of gas and liquid measurements and transportation including mixed streams, horizontal and vertical flow, etc. Prerequisites: Mechanical Engineering 346; Petroleum Engineering 310.

**414. Petroleum Production Engineering. (2-0). Credit 2. II** †

Gas lift, surface separation and treatment of oil field fluids. The measurement, sampling and testing of crude oil, tank strapping and preparation of tank tables, oil storage, the prevention of loss by evaporation, fire and lightning protection. Prerequisites: Petroleum Engineering 405, 413.

**415. Measurements Laboratory. (0-3). Credit 1. I** †

Methods of metering petroleum and natural gas. Study of flow of liquid gas and mixtures of gas and liquid. Advanced study of properties of petroleum at elevated pressure and temperature. Prerequisite: Petroleum Engineering 413 or registration therein.

**416. Oil Measurements and Transportation Laboratory. (0-3). Credit 1. II** †

Gauging practices, treating of oil-water emulsion, heat and sulphur content of petroleum and its products, determination of viscosity, gravity, water content, carbon residue, and the coefficient of expansion of petroleum. Determination of vapor pressure of natural gasoline. Distillation of crude oil and gasoline. Methods of metering petroleum. Water analysis. Prerequisite: Petroleum Engineering 414 or registration therein.

**419. Drilling Fluids. (0-3). Credit 1. II** †

A laboratory course in which field technique and control of mud fluids to facilitate drilling are taught. Prerequisites: Senior classification in petroleum engineering; approval of the Head of the Department.

**428. Reservoir Engineering. (2-0). Credit 2. I** †

Material balance methods, including identification of type of reservoir mechanism, future production under primary recovery and gas injection; water influx calculations. Prerequisites: Petroleum Engineering 306, 308, 310.

**429. Reservoir Mechanics Laboratory. (0-3). Credit 1. I** †

A laboratory course to supplement the theory of Petroleum Engineering 428. Advanced core analysis; fundamental tests of PVT properties of petroleum at reservoir conditions. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310.

**438. Reservoir Engineering. (2-0). Credit 2. II** †

Continuation of Petroleum Engineering 428. Displacement of oil by extraneous fluids, evaluation of performance of combination drive reservoirs, sweep efficiency. Prerequisite: Petroleum Engineering 428.

**481. Petroleum Engineering Seminar. (0-2). Credit 1. I** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**482. Petroleum Engineering Seminar. (0-2). Credit 1. II** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

## FOR GRADUATES

**601, 602. Drilling and Completing Wells. (3-3). Credit 4 each semester. S**

An advanced study of the problems encountered in the drilling and completing of oil and gas wells. Prerequisite: Approval of Head of Department.

**603, 604. Advanced Reservoir Engineering. (3-3). Credit 4 each semester. I, II**

An advanced course in petroleum production practices with special reference to the fundamental principles of flow of reservoir fluids. Prerequisite: Approval of Head of Department.

**605. Phase Behavior of Petroleum Reservoir Fluids. Credit 2 to 4 each semester. I**

A study of the pressure, volume, temperature, composition relationships of petroleum reservoir fluids. Prerequisite: Approval of Head of Department.

**607. Recovery Methods. Credit 2 to 4 each semester. II**

A study of methods of increasing recovery of petroleum from petroleum reservoirs. Prerequisite: Approval of Head of Department.

**608. Well Logging Methods. (2-3). Credit 3. II**

An advanced study of well logging methods for determining the nature and fluid content of formations penetrated by the drill. Prerequisite: Approval of Head of Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A study and presentation of papers on recent developments in reservoir mechanics. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II**

A course offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Advanced work on some special problem within the field of petroleum engineering. A thesis course. Prerequisite: Approval of the Head of Department.

## Department of Physics

Professor J. G. Potter,
Professors J. B. Coon, Melvin Eisner, D. F. Weekes; Associate Professors P. W. Barker, B. B. Boriskie, J. S. Ham; Assistant Professors J. P. Decker, R. A. Kane, C. M. Loyd, R. W. Mitchell, L. K. Rangan, O. D. Sittler; Instructors C. E. Blount, W. G. Cantrell, J. C. Couch, G. S. Harmon, R. M. Henson, E. R. Isham, C. E. Jones, A. D. MacKellar, Eddie Reyna,
R. E. Smith, D. R. Wiff

Students who present for transfer courses in college physics of less credit value than the required courses in this college may validate their transfer work and receive credit in physics by examination if they wish to do so.

Normally, however, students transferring with from 8 to 10 hours of physics into curricula requiring 12 hours should register for Physics 220.

**201. College Physics. (3-3). Credit 4. I, II, S**

An elementary course with material selected especially with reference to the needs of premedical and predental students and students of architecture and education. Fundamentals of classical mechanics, heat, and sound. Prerequisite: Mathematics 103.

**202. College Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

**211. A Brief Survey of Physics. (3-3). Credit 4. II**

A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 102.

**213. Physics for Students of Agriculture. (2-2). Credit 3. I, II**

A brief course emphasizing fundamentals of special importance to students of agriculture in the fields of mechanics, heat, light, and electricity. Prerequisite: Mathematics 102.

**215. Introductory Physics. (2-3). Credit 3. I**

A course for pre-veterinary medicine students restricted to those topics in physics of importance to all students of veterinary medicine. The material of the first semester is in the fields of mechanics, heat, and sound. Laboratory exercises emphasize measurements, concepts, and the experimental basis of physics. Prerequisites: Mathematics 102, 103.

**216. Introductory Physics. (2-3). Credit 3. II**

A continuation of Physics 215. The material of the second semester is in the fields of light, magnetism and electricity, and atomic, molecular, and nuclear phenomena. Prerequisite: Physics 215.

**218. Mechanics and Heat. (3-3). Credit 4. I, II, S**

A comprehensive course for students of engineering and the physical sciences, providing the background for many of the engineering courses as well as for other physics courses. Cultivation of the capacity to utilize the fundamental concepts in the solution of problems is emphasized. Mechanics, heat. Prerequisite: Mathematics 121 or 209 or registration therein.

**219. Sound, Light, Electricity. (3-3). Credit 4. I, II, S**

A continuation of Physics 218. Sound, light, and electricity. Prerequisite: Physics 218.

**220. Modern Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 218 and 219. Atomic physics, nuclear physics, and solid state physics. Prerequisites: Mathematics 122 or 210; Physics 219.

**301. Heat. (3-0). Credit 3. I** †

Heat transfer, specific heats, development of thermodynamic concepts introducing statistical machanics and kinetic theory, phase and change of state, and radiation. Prerequisites: Mathematics 307; Physics 220.

**302. Mechanical Properties of Matter. (3-0). Credit 3. II** †

Fundamentals of mechanics of particles, liquids, and solids. Prerequisites: Mathematics 308 or registration therein; Physics 218.

**310. Applications of Modern Physics. (2-2). Credit 3. I, S**

A comparatively non-technical survey of modern applications of atomic and nuclear phenomena of interest to students of geology, biochemistry, genetics, biology, engineering, education, and especially premedical and predental students. Electrons, ions, isotopes, spectra, x-rays, atomic structure, radioactivity, atomic particles, nuclear accelerators, induced radioactivity, radioactive tracers, nuclear reactors, and atomic energy. Some demonstration laboratory work will accompany certain phases of the course. Prerequisites: Chemistry 101 or 103; Physics 202, 216, or 219.

**311. Atomic and Nuclear Physics. (3-0). Credit 3. I** †

Atomic and nuclear phenomena and structures, relativity, quantum mechanics, fundamental particles. Prerequisite: Physics 220.

**314. Survey of Astronomy. (3-0). Credit 3. I, II, S**

A study of the solar system, meteors, asteroids, comets, stars, clusters, nebulae, Kepler's laws, laws of gravitation, astronomical instruments. Occasional evening meetings will be held for observation. Prerequisites: Mathematics 102, 103.

**317. Celestial Mechanics. (4-0). Credit 4. I** †

A mathematical formulation of the principles of celestial mechanics, central forces, potentials and attractions of bodies, the problem of two bodies, the problem of three bodies, the problem of n bodies. Prerequisites: Mathematics 307; Physics 201 or 218.

**322. Intermediate College Physics. (4-6). Credit 6. S**

A course for high school and junior high school science teachers and elementary science supervisors designed to fortify their preparation to a level where they can pursue upper division specialized physics courses. A review of classical physics and a brief introduction to modern physics. Prerequisite: At least six hours of credit in college physics.

**323. Topics in Electricity and Electronics. (2-3). Credit 3. S**

Topics will be treated which high school and junior high school science teachers and elementary science supervisors will be able to pursue in the instruction in their schools. Prerequisites: Mathematics 122 or 210; Physics 202, 219, or 322.

**325. Physics Laboratory. (0-3). Credit 1. I**

Experimental studies primarily in physical optics, but also some in geometrical optics and in heat, pertaining mostly to the material in Physics 301 and Physics 401. Prerequisite: Registration in Physics 401.

**326. Physics Laboratory. (0-3). Credit 1. II**

Experimental studies primarily in electricity, magnetism, and electronics, pertaining to the material in Physics 413, but some experiments may be pursued in non-electrical instrumentation and in the mechanics and properties of matter treated in Physics 302. Prerequisite: Registration in Physics 413.

**401. Optics. (3-0). Credit 3. I** †

A systematic treatment of physical and geometrical optics, applications to optical instruments. Prerequisites: Mathematics 122 or 210; Physics 220.

**405. Physical Mechanics. (3-0). Credit 3. I** †

A comprehensive formulation of the principles of mechanics, employing the calculus and vectoral methods. Orbital motion, Coriolis acceleration, motions of rigid bodies, vibrations. Introduction to advanced mechanics. Prerequisites: Mathematics 405 or registration therein; Physics 302 or the equivalent.

**413. Electricity and Magnetism. (3-0). Credit 3. II** †

DC and AC circuit theory including some electronic circuits and electrical instruments. Prerequisites: Mathematics 308; Physics 219.

**414. Electricity and Magnetism. (1-3). Credit 2. II** †

Non-linear circuits, functions of tubes in electrical circuits, electronic circuits and circuit elements for physical measurements. Prerequisite: Physics 413 or approval of the instructor.

**416. Electromagnetic Fields. (3-0). Credit 3. II** †

Electric and magnetic field theory with emphasis on vector analysis and culminating in an introduction to electromagnetic radiation; properties of dielectrics and magnetic materials. Prerequisites: Mathematics 405 or 601; Physics 413 or approval of the instructor.

**418. Theoretical Physics. (3-0). Credit 3. II** †

An introduction to theoretical physics with emphasis on fundamental concepts and general principles. Prerequisites: Mathematics 307; Physics 219.

**420. Introduction to Astrophysics. (3-0). Credit 3. II** †

An introduction to the theory and application of astrophysics. The physics of the sun's core, the internal structure of stars, spectroscopic and dynamic aspects of stellar atmospheres, radiation from the sun and stars, interstellar matter, the origin and evolution of planetary atmospheres. Prerequisites: Mathematics 307 or registration therein; Physics 220, 314, and a course in heat or thermodynamics.

**421. Celestial Mechanics. (3-0). Credit 3. II** †

A continuation of Physics 317. The laws of binary star systems, the determination of orbits, perturbations of the moon, general perturbations, the problem of satellites. Prerequisite: Physics 317.

**424. Physics of Solids. (3-0). Credit 3. II**

An examination of the modern theories of crystalline structure, specific heats, dielectric properties, conduction, semiconduction and work function phenomena, magnetism, and dispersion in solids. Prerequisite: Physics 311.

**425. Physics Laboratory. (0-3). Credit 1. I**

Classical experiments in nuclear, atomic, and molecular physics, and electromagnetic waves, employing modern instrumentation and often the specialized equipment in use in current research. Prerequisites: Senior classification in the physical sciences or engineering.

**426. Physics Laboratory. (0-3). Credit 1. II**

Primarily experiments in solid and liquid state physics. Modern instrumentation is emphasized and set-ups currently used in research are employed in many instances. Prerequisite: Registration in Physics 424.

**485. Problems. Credit 1 to 4. I, II, S**

Special work to meet individual or small group requirements in unusual cases not covered by the regular curriculum. It may be work in either laboratory or theory. Prerequisites: Approval of Head of Department.

## FOR GRADUATES

**600. Physics for Secondary School Teachers. (2-3). Credit 3. S**

This course taught by members of the Physics faculty will aim to develop convictions concerning the fundamental principles of classical and modern physics which should be taught in a course in high school physics and to develop techniques and methods of preparing and conducting demonstrations and laboratory exercises. Prerequisites: Graduate classification; approval of the Heads of the Education and Psychology and Physics Departments.

**601. Analytical Mechanics. (4-0). Credit 4. II**

Dynamics of particles and of rigid bodies, gyrodynamics, potential theory, Hamilton's principle, principle of least action. LaGrange's equations, and the Hamilton-Jacobi equation, with applications. Prerequisites: Mathematics 405 or 601; Physics 405.

**602. Fluid Mechanics and Elasticity. (4-0). Credit 4. S**

Mechanics of continuous media. Foundations of elasticity with application to theory of beams, plates, and shells. Hydrodynamics of viscous and nonviscous fluids. Supersonic flow and shock wave propagation. Boundary layer theory. Lubrication theory. Prerequisite: Physics 601 or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**603. Electromagnetic Theory. (4-0). Credit 4. I, S**

Theory of electromagnetism; static and time-varying fields; propagation, reflection, and refraction of electromagnetic waves. Prerequisites: Mathematics 601 or the equivalent; Physics 416 or the equivalent.

**605. Thermodynamics. (4-0). Credit 4. I, S**

The fundamentals of classical thermodynamics, including the first and second laws, thermodynamic potentials, conditions for equilibrium, properties of gases; thermodynamics of electromagnetic systems, and a brief treatment of kinetic theory including Maxwell's velocity distribution law, viscosity, and diffusion. Prerequisites: Mathematics 308; Physics 301 or the equivalent.

**607. Statistical Mechanics. (4-0). Credit 4. II**

Fundamentals of classical and quantum statistical methods and the application to physical systems. The statistical basis of entropy; the specific heats of gases and crystals; electronic phenomena in metals; super-fluidity; black-body radiation; and other applications to atomic and nuclear physics. Prerequisite: Approval of the instructor.

**611. Advanced Optics. (4-0). Credit 4. I**

The electromagnetic theory of optical phenomena in discontinuous, isotropic, and anisotropic media. Prerequisite: Physics 603. (Offered in 1961-62 and in alternate years thereafter.)

**612. Atomic Structure. (3-0). Credit 3. II**

A study of the atom and atomic spectra from the quantum mechanical viewpoint including the hydrogen atom, perturbation method, complex atoms, transition probabilities, angular momentum operators, multiplet structure of energy levels, fine structure and electron spin. Prerequisites: Mathematics 308 or the equivalent; Physics 311.

**614. Molecular Structure. (4-0). Credit 4. I**

The quantum mechanical theory of valence; the hydrogen molecule ion, molecular orbitals for diatomic molecules; the hydrogen molecule; coulombic and exchange integrals; Pauli exclusion principle and the covalent bond; hybrid atomic orbitals; general molecular orbital method. Prerequisite: Physics 612. (Offered in 1962-63 and in alternate years thereafter.)

**617. Physics of the Solid State. (3-0). Credit 3. II**

A study of the electrical, magnetic, thermal, and mechanical properties of crystalline solids. Lattice energy of ionic crystals, lattice vibrations, dielectric phenomena, luminescence and phosphorescence, electron theory of metals, band theory, semi-conductors, low temperature behavior of solids. Prerequisites: Mathematics 308, 405 or the equivalent; Physics 220 or the equivalent.

**618. Nuclear Theory. (3-0). Credit 3. I, S**

Application of quantum mechanics to nuclear phenomena. Prerequisites: Physics 623, 625, or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**623. Quantum Mechanics. (4-0). Credit 4. S**

Foundations of quantum mechanics; theories of Heisenberg and De Broglie with applications especially to nuclear physics. Prerequisites: Mathematics 602 or the equivalent; Physics 601, 612, 625.

**624. Quantum Mechanics. (4-0). Credit 4. I**

A continuation of Physics 623. A postulational development of the foundations of quantum mechanics; classical foundations, Hamiltonian formalism, canonical transformations, representation and expansion theory, relativistic-quantum mechanics, quantum electrodynamics, quantum field theory, fundamental particles, meson field theories, and high energy phenomena. Prerequisite: Physics 623. (Offered in 1961-62 and in alternate years thereafter.)

**625. Nuclear Structure. (3-0). Credit 3. I, S**

Properties of fundamental particles; theory of simple nuclear models; scattering, spins, magnetic moments and cross sections; alpha, beta, and gamma decay; detection, measurement, and production of nuclear particles; nuclear spectroscopy; interactions of nuclear radiations with matter; nuclear reactions; high energy nuclear phenomena. Prerequisites: Mathematics 308, 601; Physics 311 or the equivalent.

**627. Relativity. (3-0). Credit 3. II**

Special relativity and its application to covariant formulations of mechanics and electrodynamics. Theory of general relativity including development of necessary tensor calculus and non-Euclidean geometry. Predictions of general relativity and experimental tests of theory; cosmological problems and unified field theories. Prerequisites: Physics 601, 603. (Offered in 1961-62 and in alternate years thereafter.)

**631. Quantum Theory of Solids. (3-0). Credit 3. II**

Development of solid state theory from the basic theory of quantum mechanics. Theory of perfect and imperfect crystal lattices. Interaction of electromagnetic radiation with non-conducting crystals. Electrons in perfect crystal lattices. Theory of metallic cohesion. Transport phenomena. Electric and magnetic properties of solids. Semiconductors, superconductors, superfluids. Prerequisite: Physics 617.

**633. Experimental Physics. (0-3). Credit 1. I, II, S**

Experiments in atomic, nuclear, and solid state physics, designed to complement theory courses in these fields and to prepare the student for experimental research in physics. Prerequisite: Graduate classification.

**661. Radiological Physics. (3-0). Credit 3. II**

Interaction of radiation with matter, health physics and radiation protection, reactor sources of radiation, shield design. Prerequisites: Mathematics 308; Nuclear Engineering 401 or Physics 311.

**663. Reactor Theory. (3-0). Credit 3. I**

Mathematical theory of the diffusion and slowing down of neutrons in the homogeneous nuclear reactor without reflector and with reflector. Prerequisites: Mathematics 308, 601 or registration therein; Physics 312.

**664. Reactor Theory. (3-0). Credit 3. II**

A continuation of Physics 663. The steady state and transient behavior of the heterogeneous reactor. Theory of reactor control. Special mathematical methods in reactor analysis. Extensive problem work to illustrate the applications of the theory. Prerequisites: Mathematics 602 or registration therein; Physics 663.

**665. Theory of Accelerators. (3-0). Credit 3. II**

Description and classification of accelerators. Cockcraft-Walton accelerators, electrostatic generators; linear accelerators; theory of magnetic focusing; cyclotron; theory of electrostatic focusing; stability conditions, betatron; synchrocyclotron; synchrotron; low energy pulse devices; energy measurement and control; instrumentation and techniques; reactions; radiological safety. Prerequisites: Mathematics 307; Physics 311.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems not related to thesis.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Plant Sciences

Professor D. W. Rosberg,
Professors T. C. Cartwright, W. C. Hall, H. E. Joham, R. G. Reeves, G. M. Watkins; Associate Professors L. S. Bird, W. W. Heck, H. C. Lane*, W. H. Thames, Jr.; Assistant Professors L. J. Ashworth, Jr., M. C. Futrell, N. A. McNiel, C. S. Miller, J. D. Smith, J. D. Williams

### GENETICS SECTION

**301. Genetics. (3-2). Credit 4. I, II, S** †

Fundamental principles of genetics: variation, heredity, the physical basis of Mendelian inheritance, the expression and interaction of genes, linkage, sex linkage, and mutation. Laboratory includes demonstrations of Mendelian ratios with Drosophila and an introduction to biometrical methods. Prerequisite: Biology 101 or 107.

**304. Plant Breeding. (3-2). Credit 4. II** †

The improvement of crops by hydridization and selection. Special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated, and asexually reproduced plants. Prerequisite: Genetics 301. (Offered in 1961-62 and in alternate years thereafter.)

**306. Animal Breeding. (2-2). Credit 3. I, II** †

Genetics as applied to the problems of the animal breeder. Genetic and phenotypic effects of selection. Comparison of various selection methods such as mass selection, family selection, progeny and sib testing. Selection indexes. Systems of mating such as grading, cross-breeding, inbreeding, linebreeding, outbreeding, and random mating. Genetic analysis of pedigrees. Prerequisite: Genetics 301.

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*On leave of absence from 7-1-61 to 6-30-62.

**406. Statistics. (2-2). Credit 3. I, II, S** †

A study of the binomial distribution and application; chi-square analysis; central tendencies; measures of dispersion; elementary sampling and sampling distributions; tests of hypotheses; measures of relationship; analysis of variance. Prerequisite: Mathematics 102.

**Poultry Science 414. Poultry Breeding. (2-2). Credit 3. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**603. Genetics. (3-0). Credit 3. I**

Advanced study of genetics with special attention focused on the evidence supporting the principles of heredity. Development of fundamental concepts including dominance, the chromosome theory of heredity and linkage, sexuality, mutation and position effect, the gene concept and extra nuclear inheritance. Prerequisites: Genetics 301; approval of the instructor.

**604. Genetics Laboratory. (0-3). Credit 1. I**

Inheritance studies principally with Drosophilia including laboratory techniques and methods. Arranged to complement Genetics 603 and required for genetics majors.

**605. Statistics. (3-3). Credit 4. I**

Analysis of variance, covariance analysis, multiple regression, introduction to experimental designs. Prerequisite: Genetics 406.

**606. Biometry. (3-3). Credit 4. II**

Methods of constructing and analyzing designs for experimental investigations. Simple and partial confounded factorial designs; treatment of missing data. Prerequisite: Genetics 605.

**612. Plant Genetics. (3-3). Credit 4. II**

Specialized study of genetics as related to plant breeding. Emphasis is placed on quantitative inheritance, heterosis, selection, ploidy, reproductive systems and the processing of quantitative data. Prerequisites: Genetics 304, 406, 603.

**616. Animal Genetics. (3-3). Credit 4. II**

The specialized study of animal genetics and population genetics especially as related to the improvement of herds, flocks or other groups within a species. Emphasis is placed on causes of change in gene frequency, methods of selection, systems of mating and heterosis; the inter-relationship among these forces and their measurement. Prerequisites: Genetics 306, 406, 603.

**620. Cytogenetics. (3-3). Credit 4. II**

A study of correlated genetical and cytological phenomena. Prerequisites: Biology 615; Genetics 301.

**623. Special Topics in Genetics. Credit 1 to 3. I**

Content of this course will depend upon the interest of the students and the specialty of the instructor. Lecturers who have attained distinction in genetics or related fields will conduct this course.

**624. Statistical Genetics. (2-0). Credit 2. I**

Probability as applied to genetic systems; the derivation of genetic expectations; the theory of inbreeding; estimation and testing of genetic parameters; statistical aspects of quantitative inheritance; the partition of variance; covariances among relatives; mathematical models for quantitative inheritance. Prerequisites: Genetics 406, 603; approval of the instructor. (Offered in 1962-63 and in alternate years thereafter.)

**625. Speciation. (2-0). Credit 2. I**

A study of the genetic and environmental forces which operate in species formation together with a critical examination and comparison of the more important current explanations of speciation. Prerequisites: Biology 349; Genetics 301. (Offered in 1962-63 and in alternate years thereafter.)

**628. Animal Breeding. (2-0). Credit 2. I**

A course designed to acquaint the student with the current status of knowledge in the field of animal breeding through a critical survey of the literature. Emphasis is given papers dealing with problems of breeding for quantitative traits of economic importance in farm animals including beef cattle, dairy cattle, poultry, sheep, and swine. Considerable attention is focused on methods which have been used or are available for use in studying animal breeding problems. Prerequisite: Genetics 616. (Offered in 1961-62 and in alternate years thereafter.)

**631. Biochemical Genetics. (2-0). Credit 2. I**

A study of the genetic control of cellular metabolism and a theoretical consideration of the mechanism of gene action. A consideration of nutrition and the genetic capacity for biosynthesis, gene-enzyme relationships, pleiotropism, plasmagenes, and the chemical nature of the agents of heredity. Prerequisites: Biochemistry and Nutrition 410 or Chemistry 227; Genetics 301.

**633. Forest Genetics. (2-0). Credit 2. I**

Specialized study of genetics as applied to forest trees; forest genetics, forest tree improvement and forest tree breeding, with emphasis on genetics of conifers, especially pines. Fundamental and applied phases are included. Prerequisites: Genetics 603; approval of the instructor. (Offered in 1962-63 and in alternate years thereafter.)

**634. Forest Genetics Laboratory. (0-3). Credit 1. II**

Methods and techniques in forest genetics, forest tree breeding; crossing, grafting, air layering, field layouts, seed handling, greenhouse techniques. Prerequisite: Genetics 633. (Offered in 1962-63 and in alternate years thereafter.)

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Technical research problems subject to approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Prerequisite: Genetics 603.

**Poultry Science 613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

See Department of Poultry Science for a full description of this course.

## PLANT PHYSIOLOGY AND PATHOLOGY SECTION

**301. Plant Pathology. (2-3). Credit 3. I**

An introduction to the fundamental principles of plant pathology, including diagnosis, cause, and control of plant diseases. Prerequisites: Biology 101, 206.

**302. Plant Disease Diagnosis. (0-3). Credit 1. II**

A practice course designed to give the student experience in diagnosing plant disease problems. All categories of plant diseases will be studied. Prerequisite: Plant Physiology and Pathology 301 or approval of the instructor.

**313. Introduction to Plant Physiology. (2-3). Credit 3. I**

A general course dealing with the principal life processes of the higher plants, with particular emphasis on the influence of environmental factors on the processes and development of crop plants. Prerequisites: Biology 101; Chemistry 102 or 104.

**314. Principles of Plant Physiology. (3-3). Credit 4. II** †

A more advanced and detailed study of the physiology of green plants than Plant Physiology and Pathology 313, with emphasis on nitrogen metabolism, respiration, mineral nutrition, photosynthesis, and growth. Prerequisites: Chemistry 231; Physics 213; Plant Physiology and Pathology 313.

## FOR GRADUATES

**605. Plant Metabolism. (3-0). Credit 3. I**

Photosynthesis and respiration are discussed in detail, including the history and recent developments in these fields. Prerequisite: Plant Physiology and Pathology 314, or Biochemistry and Nutrition 601 and approval of instructor. (Offered in 1961-62 and in alternate years thereafter.)

**607. Physiology of the Fungi. (3-0). Credit 3. II**

A general course in the physiological activities of fungi, including growth and development, mineral nutrition, carbon and vitamin nutrition, the chemistry of metabolic products, fungicides, and the physiology of parasitism and resistance. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1961-62 and in alternate years thereafter.)

**609. Quantitative Plant Physiology. (2-6). Credit 4. II**

Methods employed in the various types of physiological investigations and the interpretation of results obtained by them. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1961-62 and in alternate years thereafter.)

**611. Plant Nutrition. (3-0). Credit 3. II**

This course deals with the inorganic nutrition of plants. It includes solute absorption, accumulation and translocation; growth of plants in artificial media; physiological roles of various elements in the plant, and biochemical problems associated with salt absorption. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**612. Phytohormones and Plant Growth Regulators. (3-0). Credit 3. I**

This course includes material on the classification, properties, and action of naturally occurring plant hormones as well as a discussion of the synthetic growth regulators. Material is included on practical application and uses of phytohormones and growth regulators. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**613. Plant Growth and Development. (3-0). Credit 3. I**

A course dealing with the growth, differentiation, and development of higher plants. A comprehensive study of vernalization and photoperiodism is included as well as a discussion of the influences of water relations, mineral nutrition, and hormones on the developmental cycle. Consideration is also given to differentiation within the plant as related to such qualities as winter hardiness and drought resistance. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**616. Methods in Plant Pathology. (2-6). Credit 4. II**

A presentation of the methods by which plant diseases are identified and investigated. Emphasis is placed on preparation for research work in plant pathology. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**617. Parasitism in Plant Disease. (3-3). Credit 4. I**

A critical presentation of the literature on the invasion of plant tissues by parasitic bacteria, fungi, and nematodes. Mechanisms of host defense are examined. Processes are illustrated in the laboratory through the study of histological preparations and by experimentation. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1961-62 and in alternate years thereafter.)

**618. Bacterial Plant Diseases. (2-3). Credit 3. II**

A detailed study of bacterial diseases of fruit and vegetable crops, field crops and ornamental plants, with special emphasis upon the nature of the disease, dissemination of the pathogen and methods of control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**620. Plant Viruses. (2-0). Credit 2. II**

Lecture presentation and discussion of the nature and properties of plant viruses. Methods of virus transmission, host plant reactions to viruses, serological reactions, and methods of purification of viruses for examination under the electron microscope, and the study of economically important plant virus diseases and their control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**621. Plant Parasitic Nematodes. (2-3). Credit 3. I**

The morphology, identification, and biology of plant parasitic nematodes; the damage they cause; methods of control. Non-plant-pathogenic nematodes commonly found in the soil will be studied also. Prerequisite: Approval of the instructor.

**622. Plant Nematology. (1-6). Credit 3. II**

Advanced study of the principal groups of plant parasitic nematodes, with emphasis on methods used in research. Prerequisite: Plant Physiology and Pathology 621. (Offered in 1962-63 and in alternate years thereafter.)

**623. Diseases of Field Crops. (2-3). Credit 3. I**

An intensive study of both the fundamental and the practical aspects of the more important and representative diseases of field crops. The plant disease problems peculiar to extensive cultivation methods will be stressed. Prerequisite: Plant Physiology and Pathology 301.

**624. Diseases of Fruits, Vegetables, and Ornamentals. (2-3). Credit 3. II**

Identification and control of the important diseases of fruit, vegetable, and ornamental crops in Texas. Consideration will also be given to diseases of major berry crops and pecans. Various diseases and types of decay affecting products in shipment and storage will be studied. Each student will be required to carry out an inoculation-isolation exercise employing a bacterial or fungus pathogen. A virus inoculation exercise will be done by students working in pairs. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1961-62 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Reports and discussions of topics of current interest in plant physiology and plant pathology, including reviews of literature on selected subjects.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or dissertation. Prerequisite: Plant Physiology and Pathology 314 or the equivalent (for physiology), 301 or the equivalent (for pathology).

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigations in support of thesis or dissertation.

**Biochemistry and Nutrition 601. Biochemistry of Plants. (3-0). Credit 3. I**

See Department of Biochemistry and Nutrition for a full description of this course.

## Department of Poultry Science

Professor J. H. Quisenberry,
Professors J. R. Couch, W. F. Krueger; Associate Professor T. M. Ferguson;
Assistant Professors R. L. Atkinson, R. E. Davies, R. C.
Fanguy, F. A. Gardner, C. B. Ryan

**201. Poultry Production. (2-2). Credit 3. I, II**

The breeds and types of poultry, culling poultry for egg production, incubation, brooding and feeding for growth and egg production, winter and summer management, housing and hygiene, preparing poultry for market, methods of marketing, practical application of these subjects to farm conditions. The practice consists of the identification of breeds and varieties, judging poultry for egg production, plans for poultry farms and poultry houses, identification of feeds, and formulation of poultry rations.

**303. Turkey Production. (2-0). Credit 2. II**

Varieties of turkeys; breeding practices; management and feeding; incubation practices; management of poults from hatching to market; special turkey marketing practices; sanitation and disease prevention with special reference to turkeys.

**308. Hatchery Management. (2-3). Credit 3. II**

Commercial hatching in America, early commercial hatcheries, expansion, types of hatchery enterprise, related activities, localization of hatchery business, how and where to start, hatchery building, inside arrangement, ventilation, heat and temperature control, hatchery equipment, types of incubators; hatchery flock improvement, study of the National Poultry and Turkey Improvement Plans, sanitation, incubation practices, prices and hatchery costs. Trends in size of hatcheries and causes. Practice consists of culling and blood testing hatchery flocks, setting eggs in incubator, fumigating and disinfecting incubator, candling hatching eggs, pedigreeing and judging baby chicks.

**309. Broiler Production. (2-2). Credit 3. I**

A study of modern commercial broiler production including type of birds required for successful broiler operation; the importance of such factors as body conformation, rate of growth, feathering, livability, uniformity, and feed efficiency; housing and equipment requirements for brooding, advantages of different brooding and management systems; disease hazards; a study of cost factors such as feed, chick, labor, medication, and overhead; methods of marketing broilers; methods of financing broiler operations; integration in the broiler industry. Practice involves the design, setting up and conducting broiler tests for evaluation of modern strains, feeds, and management practices. At the end of the tests the birds will be graded, dressed, and production costs calculated.

**401. Management and Selection. (1-2). Credit 2. II** †

How to select breeding males and females; culling the farm flock; planning a poultry program for a community with emphasis on good management and soundness of health; how to plan and manage county poultry shows. A thorough study of the National Poultry Improvement Plans, with enough practice work in selecting and testing to qualify students for official Plan participation.

**403. Judging. (2-2). Credit 3. I**

The judging of standard breeds and varieties; special instructions for judges; methods of fitting and showing birds; types of shows and show management; a study of standard disqualifications and their application to various selection standards; grading of live and dressed market poultry, and of market eggs. Practice work consists of judging classes for production and for market quality. Several small poultry shows will be judged, and visits made to egg and poultry processing plants and farms of poultry breeders.

**407. Technology and Marketing of Poultry and Poultry Products. (2-2). Credit 3. I**

A study of the U.S.D.A. grades of eggs, and of live and dressed poultry; preparing poultry for market—killing, dressing, chilling, and packaging; candling; grading, and packing shell eggs; drying and freezing eggs; storage problems and techniques with special emphasis on maintenance of quality during storage; planning poultry and egg plant layouts with special emphasis on meeting U.S.D.A. requirements for sanitation; a study of commercial egg and poultry plants and their operation; newer developments in packaging and merchandising poultry and eggs; effects of feed upon quality and quality retention; a careful study of regulations governing the grading and inspection of poultry of the U. S. Department of Agriculture, with special emphasis on inspection for wholesomeness.

**411. Poultry Feeding. (3-2). Credit 4. I** †

The history of poultry nutrition, a short study of the chemical composition of carbohydrates, proteins, fats, vitamins, and mineral mixtures as found in poultry feeds. Composition, functions, sources, and care of vitamins commonly required for efficient poultry feeding. A study of the nutritive value of the different grains, roughages, mill feeds, and protein concentrates used in poultry nutrition. Practice work in the analysis of feedstuffs, the formulation of poultry rations, and diagnosis of lack of essentials in poultry rations. Prerequisites: Chemistry 223, 231.

**414. Poultry Breeding. (2-2). Credit 3. I** †

The basic principles of poultry breeding. The inheritance of characters of economic importance. The records essential for a sound breeding program; the selection of breeders on the basis of records and standardbred characteristics. Practice includes taking records on the breeding birds, interpreting the records, and the techniques involved in pedigree breeding. Prerequisite: Genetics 301.

**481. Poultry Seminar. (1-0). Credit 1. I**

Extensive review of the literature on poultry problems. The student will be required to prepare and present to the class comprehensive reviews of the literature on various phases of poultry science. Each student will be assigned a certain number of technical journals for current reporting to the seminar group. Prerequisite: Senior classification.

**482. Poultry Seminar. (1-0). Credit 1. II**

Continuation of Poultry Science 481.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

A directed study of a selected problem not covered by other courses in the Department of Poultry Science. The content of the course would be adapted to the interest and needs of the students. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**603. Principles and Practices of Incubation. (3-3). Credit 4. II**

A study of the developmental stages of the chick during incubation. Correlation of development with genetic and environmental factors. Study of the fundamental principles underlying successful artificial incubation of eggs. Relation of egg characters to hatchability. Effects of pre-incubation treatment on hatchability of chicken and turkey eggs. Control of disease during the incubation process. Relation of maternal diet to embryonic development and hatchability of the chick. Prerequisite: Poultry Science 308 or equivalent.

**604. Principles of Brooding and Rearing. (3-3). Credit 4. I**

A study of principles involved in brooding poultry. Relative cost and efficiency of different brooding and rearing methods. Relation of brooding practice to growth, livability, and subsequent adult performance. Such factors as diet, levels of protein, minerals, vitamins, medicants and growth stimulants are analyzed in relation to growth, livability, malformations, and feed efficiency. Physiological factors such as temperature control mechanisms and hormones are covered. Research methodology and thorough literature review are stressed. Prerequisites: Poultry Science 201 and 303 or equivalent.

**609. Avian Physiology. (3-3). Credit 4. I**

A study of basic physiological principles pertaining specifically to the avian species. The chicken will be used as the laboratory animal. The vascular, digestive, neural, respiratory and reproductive systems will be stressed. Prerequisites: Biology 433; approval of instructor.

**611. Poultry Processing, Storing, and Distribution. (3-0). Credit 3. II**

A study of egg quality and of egg quality maintenance. Effects of storage on egg and meat quality. The latest methods of processing eggs and poultry; feeding of market birds to improve grade; costs of production for various areas, and for various sized flocks and methods of management; planning optimum sized units for economical production. Prerequisites: Agricultural Economics 314 or equivalent; Poultry Science 407 or the equivalent.

**612. Laboratory Problems in Poultry Processing, Storing, and Distribution. (0-3). Credit 1. II**

A survey of improved methods of processing poultry and eggs. Certain selected modern processing plants will be visited and a study made of operating methods. Students may assist with experimental work in progress on poultry and egg processing and storage. Laboratory comparisons of various methods of fattening and their effects on market and storage quality of fowl. Effects of temperature and methods of dressing on market and storage quality. Prerequisite: Poultry Science 611 or registration therein.

**613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

An advanced and specialized study of poultry breeding and genetics covering such areas as causation, interrelations among traits, effective size of populations, methods of measuring genetic improvement, the heterosis concept, measures of general and specific combinability, and genetic homeostasis. Efficiency of various systems of breeding poultry will be analyzed. Scientific journals and technical literature will be reviewed. Prerequisites: Genetics 301 and Poultry Science 414 or the equivalent.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Intensive review and reporting of literature on poultry feeding, breeding, incubation, marketing, and management problems. Development of familiarity not only with literature but with organizations, agencies, and personnel working with poultry problems. Prerequisite: Graduate classification. May be repeated as many semesters as desired but maximum of two credits allowed toward Master's degree.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

An intensive study of newer principles and methods in the various specialized fields of poultry science—breeding, nutrition, market technology. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Intensive study of research methods and techniques in poultry breeding, nutrition, physiology, physical aspects of marketing, or poultry products technology. Students will be required to carry out some experimental projects in one of these fields. Reviews of specific literature, collection, analysis, and presentation of experimental data will be stressed. Designed for thesis and dissertation credit.

## Department of Range and Forestry

Professor C. L. Leinweber,
Professors R. A. Darrow, O. E. Sperry; Associate Professors F. W. Gould, W. G. McCully, R. R. Rhodes; Assistant Professors D. L. Huss, W. J. Waldrip

**102. Introduction to Range and Forestry. (1-0). Credit 1. II**

A brief survey of the fields of forestry and range management including the history, resources, policies, organization, industries, employment, education and research pertaining to the respective professions. One field trip into the forest is required.

**202. Range Plants. (2-3). Credit 3. I**

Native forage plants of the ranges of the United States. Determination, distribution, ecology, and economic value, especially in Texas are considered. Poisonous plants and range practices to avoid livestock losses are included. Prerequisite: Biology 102 or the equivalent.

**203. Dendrology. (1-3). Credit 2. I**

The identification, classification, group silvical characteristics, distribution, and values of the important trees and shrubs of the coniferous group (Gymnosperms). Field trips arranged. Prerequisite: Biology 102.

**204. Dendrology. (2-3). Credit 3. II**

The identification, classification, group silvical characteristics, distribution, and values of the important trees of the hardwood group (Angiosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Field trips arranged. Prerequisite: Biology 102.

**301. Plant and Range Ecology. (2-3). Credit 3. II** †

An analysis of habitat factors as they influence plant growth. Attention is given plant succession, competition and distribution of plants in relation to the environment. Prerequisite: Biology 102.

**303. Agrostology. (2-3). Credit 3. I** †

A fundamental study of grasses, especially those of economic importance in Texas. A study of the characteristics of the various genera and species of grasses, their identification, distribution, propagation, improvement, and management with particular reference to their use and value in Texas ranges and pastures. Prerequisite: Biology 102 or equivalent.

**304. Range Management. (2-3). Credit 3. I** †

A technical course dealing with problems met in managing native range lands, including a study of grazing regions, and the problems of each; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock mangement as it affects vegetation. Field trips. Prerequisites: Range and Forestry 301, 303.

**308. Forest Management. (2-3). Credit 3. II**

A study of the principles and problems involved in the management of forest stands for multiple use of timber, forage, wildlife, and watershed protection; the application of tree and log measurements to the principal forest products; and the preservation of wood products for farm and ranch use. Field trips.

**309. Silvics and Silviculture. (2-3). Credit 3. I**

A study of the factors of site, their influence on tree growth and reciprocal effect on site; silvicultural cutting systems, cultural operations, and the silvicultural characteristics of the more important commercial species of the South and Southwest. Field trips. Prerequisite: Range and Forestry 308.

**310. Forest Products and Utilization. (2-2). Credit 3. II**

Utilization of the products of farm woodlots, woodlands and commercial forests; the manufacture and utilization of lumber, timber, and other wooden products, including mechanical properties, and lumber grades. Also the identification of certain woods important in agricultural and commercial enterprises of the South and Southwest. Field trips.

**401. Range Improvement and Maintenance. (2-3). Credit 3. I, II**

A general course for students not majoring in range management. Native forage and poisonous plants on the ranges of Texas. Evaluation and analysis of range lands, grazing systems, livestock handling problems, physiology of plant responses to grazing and range management, range condition classification. Field trips.

**409. Advanced Range Management. (2-3). Credit 3. II** †

A technical course dealing with the more advanced problems in managing native range lands. Special attention will be given to the study of the development of the range industry, cost of production, range land utilization, grazing systems, range trend, and condition classes. Field trips. Prerequisite: Range and Forestry 304.

**411. Field Range Management. Credit 2 or 3. S** †

A semi-technical summer field course in which emphasis is placed upon identification of important range plants; determination of vegetation types, subtypes, forage utilization values, range condition classes, mapping; brush eradication and control, and proper distribution of livestock. A summer field course primarily for county agricultural agents and vocational agricultural teachers, others by approval of instructor.

**412. Range Management Practices. (2-3). Credit 3. I, II**

Livestock management as related to utilization of range lands; range and ranch management planning; evaluation and survey of forage resource; economic principles associated with range livestock management. Prerequisite: Range and Forestry 304 or 401.

**485. Range Problems. Credit 1 to 3 each semester. I, II, S** †

Individual study and research upon a selected range problem approved by instructor.

## FOR GRADUATES

**605. Range Research Methods. Credit 2. I**

A study of research methods in range management and related subjects. A review of scientific investigation in the field and analysis of results. Prerequisite: Graduate majors in range and forestry.

**606. Range Economics. (2-0). Credit 2. II**

Range management practices, land utilization, and ranch operation as they affect economics of livestock industry and the nation. Prerequisite: Graduate majors and minors in range and forestry.

**607. Vegetation Influences. (3-0). Credit 3. I**

Interrelationships between ecological factors and vegetation, influence of forest and range vegetation on watershed management and soil conservation. Prerequisite: Range and Forestry 301. (Offered in 1961-62 and in alternate years thereafter.)

**609. Plant and Range Ecology. (3-0). Credit 3. I**

A detailed study of plant communities, successions, and the effect of various degrees of utilization in vegetation types and edaphic factors. Prerequisite: Range and Forestry 301 or equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**610. Range Grasses and Grasslands. (2-3). Credit 3. II**

A study of range grasses as applied to utilization and sustained production. The ecological characteristics and geographical features of the native grasslands. Ecological principles as applied to range problems. Individual problems to be assigned. Prerequisites: Range and Forestry 301, 303; approval of Head of Department.

**611. Control of Noxious Range Plants. (3-0). Credit 3. II**

An advanced study of native and naturalized noxious and poisonous plants on Texas ranges that are detrimental to good management practices. Their distribution, reproduction, dissemination, and methods and practices of control will be stressed in relation to conservation and economic importance. Field trips to be arranged. (Offered in 1962-63 and in alternate years thereafter.)

**612. Range Management Practices, Policies, and Administration. (3-0). Credit 3. I**

Advanced studies dealing with technical range management problems, social and economic background of legislation, and policies developed in the acquisition and administration of national, state, and private range properties. Field trips to be arranged. Prerequisite: Range and Forestry 409 or equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Current scientific work in range management and related subjects in American and foreign fields. Prerequisite: Majors and minors in range and forestry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed for investigations not included in the student's research for thesis or dissertation. Problems may be selected in applied ecology, range management, or forestry. Lectures, conferences, field work, reports. Prerequisite: Graduate majors or minors in range and forestry.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation. Prerequisite: Graduate major in range and forestry.

## Department of Soil and Crop Sciences

Professor W. O. Trogdon,
Professors H. T. Blackhurst, M. E. Bloodworth, F. R. Brison, M. S. Brown, L. C. Coffey, A. F. DeWerth, J. F. Fudge, H. E. Hampton, E. C. Holt, G. W. Kunze, T. E. McAfee, R. C. Potts; Associate Professors E. E. Burns, A. G. Caldwell, F. L. Fisher, C. L. Godfrey, H. C. Mohr, R. D. Staten, J. B. Storey, E. L. Whiteley; Assistant Professors J. E. Endrizzi, J. F. Mills, P. E. Pawlisch, J. D. Smith; Instructors J. R. Justin, D. A. Pate

### AGRONOMY SECTION

**105. Fundamentals of Crop Production. (2-2). Credit 3. I, II**

Classification and distribution of farm crops; importance of good varieties and good seed; crop improvement; preparation of the seed bed; commercial fertilizers; manures and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies.

**301. Soil Science. (3-2). Credit 4. I, II, S**

A basic course in soil science which deals with the principles of soil chemistry, physics, microbiology, fertility, and pedology. Prerequisite: Chemistry 102 or 104.

**305. Seed Technology and Commercial Grading. (2-3). Credit 3. II**

A study of the important crop seeds with emphasis on harvesting, cleaning, and storage as they influence quality of planting seed. The grading of grain, cotton and hay according to Federal standards. Prerequisites: Agronomy 105; Biology 101.

**306. Grain and Fiber Crops. (3-2). Credit 4. I**

A study of the geographical distribution, classification, physiology, principles of production, and use of the grain and fiber crops. Prerequisites: Agronomy 105, 301; Biology 101.

**308. Forage Crops. (2-2). Credit 3. I, II**

The production, utilization, and identification of the major forage crop plants with emphasis on adapted species and varieties for the Southwest. Prerequisites: Agronomy 105, 301; Biology 101.

**310. Soil Morphology. (1-3). Credit 2. II**

Field study of the morphological features of the soil profile in relation to soil utilization and management. Soil development, classification, and mapping are also covered. Prerequisite: Agronomy 301.

**318. Soil Conservation. (3-3). Credit 4. I, II, S**

A course dealing with the importance of soil conservation from the standpoint of different soil types in the agricultural regions of Texas and the United States. Conservation methods are presented according to climatic regions, cropping systems, topographic locations, and other influencing factors. Field practice in the making of a map of a farm, its soil, and a plan of reorganization for soil conservation. Prerequisite: Agronomy 301.

**413. Soil and Crop Management. (3-0). Credit 3. II** †

A study of the special problems in the utilization and management of soils and crops under varying soil and climatic conditions. Independent work in solving current agronomic problems in different parts of the Southwest required. Prerequisites: Agronomy 301; senior classification.

**417. Pasture Management. (2-2). Credit 3. I, II** †

Adaptation and mangement of native and introduced pasture plants; their establishment, production, utilization, and maintenance in permanent and temporary pastures. Field trips are required. Prerequisite: Agronomy 301.

**422. Soil Conditions and Plant Growth. (3-4). Credit 4. I, S** †

The chemical, biological, and physical processes, activities, and conditions in soils as they influence plant growth. Prerequisites: Agronomy 301; approval of the instructor.

**426. Fertilizer Technology. (2-0). Credit 2. II**

A study of the problems of the manufacture, storage, and application of commercial fertilizers, including a limited number of required field trips to various types of fertilizer plants. Prerequisites: Agronomy 301; 14 hours of chemistry and/or physics.

**428. Turf Management. (2-2). Credit 3. II**

A study of the fundamental and special problems in the establishment, utilization, and management of turf grasses under varying use conditions. Field trips are required. Prerequisites: Agronomy 301; Plant Physiology and Pathology 301, 313.

**445. Soil Physics. (2-3). Credit 3. I** †

A study of the fundamentals of soil physics and their application to the solution of problems in crop production, irrigation, and engineering. Prerequisites: Nine hours of soils and physics, with a minimum of three hours of each (may include soil mechanics).

**481. Agronomy Seminar. (1-0). Credit 1. I, II**

The preparation and presentation by the students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit field or laboratory investigation or the study of subject matter not included in established courses. Prerequisites: Ten hours of junior and senior agronomy.

**Genetics 304. Plant Breeding. (3-2). Credit 4. II** †

See the Genetics Section of the Department of Plant Sciences for a full description of this course.

## FOR GRADUATES

**601. Grain and Cereal Crops. (3-0). Credit 3. II**

An advanced study of grain and cereal ecology, utilization, physiology and morphology, including a critical review of world literature reporting recent investigations in this field.

**602. Forage Crops. (3-0). Credit 3. I**

An advanced study of forage production, utilization, ecology, physiology, and morphology. Factors affecting initiation of regrowth and seed and forage quality. It includes a review of world literature reporting recent investigations in this field.

**605. Pedology. (3-0). Credit 3. I**

An advanced study of the development, morphology, constitution, and classification of soils.

**617. Advanced Soil Physics. (3-3). Credit 4. II**

The physical constitution and properties of soil, including consistence and structure, aeration, soil water, and thermal relationships. Prerequisites: Agronomy 445 or the equivalent and a two-semester course in physics. (Offered in 1962-63 and in alternate years thereafter.)

**618. Advanced Soil Analysis. (2-3). Credit 3. II**

A course designed to familiarize the student with the more difficult problems of soil analysis and the interpretation of the data. Prerequisite: Agronomy 422. (Offered in 1961-62 and in alternate years thereafter.)

**624. Physical Chemistry of Soils. (3-3). Credit 4. I**

The physical chemistry of clay minerals and the inorganic and organic soil colloids. Prerequisites: Agronomy 617, 618; Chemistry 323, 324. (Offered in 1962-63 and in alternate years thereafter.)

**626. Soil Mineralogy. (3-3). Credit 4. I**

A study of the crystal structures and properties of the more important agricultural and industrial clays combined with identification techniques involving X-rays, differential thermal analysis, and electron microscopy. (Offered in 1961-62 and in alternate years thereafter.)

**627. Soil Fertility Relationships. (2-0). Credit 2. II**

An advanced study of the concepts and approximations that have been used to describe the relationships between nutrient supplies and plant responses, and the techniques of applying this information in the solution of problems. Prerequisites: Agronomy 422 and Plant Physiology and Pathology 314, or registration therein. (Offered in 1962-63 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A seminar for graduate students and staff members in soils and crops. Presentation and discussion of special topics and research data in the field of agronomy. Participation is required of all graduate students in agronomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced problems in some phase of agronomy not directly related to the thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the thesis or dissertation.

**Genetics 612. Plant Genetics. (3-3). Credit 4. II**

See the Genetics Section of the Department of Plant Sciences for a full description of this course.

## FLORICULTURE SECTION

**206. Ornamental Plants. (2-2). Credit 3. I**

An introduction to the identification and appreciation of woody plants commonly grown in nurseries and used in landscape plantings. Prerequisite: Biology 101.

**207. Ornamental Plants. (2-2). Credit 3. II**

A continuation of Floriculture 206 emphasizing the identification and appreciation of woody and herbaceous ornamental plants and their use in landscape plantings. Prerequisite: Floriculture 206.

**319. Exotic Plants. (2-2). Credit 3. I**

A detailed study of the new, unusual, and rare ornamental plants, with emphasis on the exotic plants of the tropic and subtropic zones of the world including their identification, use, and adaptation to both outdoor and indoor landscape developments. Prerequisite: Floriculture 207.

**327. Principles of Floriculture. (2-2). Credit 3. II**

A study of the specialized management techniques and the application of scientific developments to the practices involved in the operation of modern nurseries, greenhouses, garden centers, flower shops, and other operations devoted to the production and marketing of ornamental plants.

**424. Propagation of Ornamental Plants. (2-2). Credit 3. II** †

A scientific study of plant propagation with special emphasis on the anatomical and physiological considerations involved and their importance to the highly technical procedures required in modern commercial propagation. Prerequisite: Plant Physiology and Pathology 313.

**425. Landscape Maintenance and Construction. (3-3). Credit 4. II**

The principles and practices involved in grading, drainage, and construction of landscaped areas including the preparation of specifications and cost estimating, soil preparation, planting and transplanting operations, control of plant pests, scientific pruning methods, and arboriculture. Prerequisite: Floriculture 207.

**429. Nursery and Greenhouse Crops. (3-3). Credit 4. I** †

The application of basic scientific developments to the principles and practices involved in the production, harvesting, grading, and distribution of plants grown in modern nurseries, greenhouses, and other forcing structures. Prerequisites: Floriculture 327; Plant Physiology and Pathology 313.

**432. Homesite Floriculture. (2-2). Credit 3. II, S**

The application of floriculture and landscape horticulture to modern living. A survey course open to all college students. The objectives of the course are to help future homeowners with an understanding of the landscape arrangement of the home grounds, their proper maintenance and development including the use of plants and flowers in the home. Not open to majors in floriculture. Prerequisite: Junior classification.

**485. Special Problems. Credit 1 to 4. I, II**

Special problems in floricultural production and marketing and in landscape horticulture. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**609. Taxonomy of Ornamental Plants. (2-2). Credit 3. I**

Specialized study of the genera, species, varieties, and clons of woody and herbaceous ornamental plants including identification, form, structure, and uses and their adaptability to the climatic conditions of the Southwest. Specific problems with these plants will be studied under field conditions. Emphasis on the taxonomy, physiology, and anatomy of these plants.

**610. Tropical Foliage Plants. (2-2). Credit 3. II**

An intensive study of the rare and exotic plants of tropical and subtropical regions of the world including the identification, adaptation, cultural requirements, propagation, and economic importance. Specific problems in taxonomy, physiology, and anatomy of these plants.

**615. Greenhouse Problem Diagnosis. (0-3). Credit 1. I**

Instruction in the diagnosis of routine problems encountered in the management and maintenance of greenhouse facilities and the problems involved in the propagation, care, and analysis of plants grown in greenhouses for scientific investigations. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or a dissertation. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## HORTICULTURE SECTION

**201. General Horticulture. (2-2). Credit 3. I, II**

A survey of the general field of horticulture; the growth and fruiting habits of horticultural plants; a study of the principles and practices of propagation, including seedage, cuttage, graftage, and special methods; a study of the planting, care, culture, harvesting, handling, and utilization of fruit and vegetable crops. Prerequisite: Biology 101.

**311. Processing Horticultural Crops. (2-3). Credit 3. I** †

A study of the principles and practices of canning, quick freezing, dehydration, pickling, and juice manufacture of fruits and vegetables. Fundamental concepts of the various techniques of preparation, processing, packaging, and use of additives will be given. Field trips to commercial processing plants will be made.

**319. Orchard Management. (2-2). Credit 3. II**

Study of orchard practices including soils and sites, planting, cultivation, pruning, spraying, harvesting, temperature relations, water relations, and selection of varieties. Prerequisite: Horticulture 201.

**322. Vegetable Crops Management. (2-3). Credit 3. I**

The principles of vegetable crop production will be covered. The factors of climate, soil, crop rotation, variety, plant growing, transplanting, planting, irrigation and drainage, weed control, insect and disease control, harvesting, marketing, storage, and special cultural practices will be considered. All of the major vegetable crops will be discussed with reference to these factors.

**418. Nut Culture. (1-3). Credit 2. II** †

Importance of nut crops, emphasis on pecan; problems of developing and maintaining pecan groves; developing native trees; study of varieties, fruit setting, soils, fertilizers, propagation methods, harvesting, handling, shelling, storage, and marketing the crop. Practice: Budding and grafting nursery stock, topworking native trees, storage and handling of budwood, examination of soils, spray application, visits to shelling plants.

**422. Citrus and Subtropical Fruits. (2-2). Credit 3. I** †

A study of subtropical fruits, with attention to citrus fruits, figs, olives, avocados, and dates. Practice: Study of varieties of subtropical fruits and their products; propagation and care of the various subtropical fruits.

**426. Commercial Propagation. (2-2). Credit 3. II** †

A study of principles and practices followed in the propagation of fruit trees. The course includes a study of graft union, congeniality between stocks and scions, adaptation of stocks to environment, and commercial propagation practices for important fruits. Practice includes special treatments for seeds, budding, grafting, and transplanting for important fruits.

**434. Grading and Packing Vegetables. (2-3). Credit 3. I** †

A consideration of the factors of good quality in market vegetables. Standard grades and packages. Shipping methods. The relation of production methods to quality. Transit losses. The methods of marketing open to the producer. Recent trends in marketing and packaging.

**444. Laboratory Examination of Processed Food. (1-3). Credit 2. II** †

Practice and theory in chemical, physical, microscopic, and microbiological methods of food analysis and interpretation of results. Federal and State regulations will be considered. Prerequisite: Approval of the instructor.

**446. Commercial Fruit and Vegetable Canning. (2-3). Credit 3. II** †

An advanced course in pilot plant and laboratory operations pertaining to the production of canned fruits and vegetables. Prerequisite: Horticulture 311.

**481. Seminar. (1-0). Credit 1 each semester. I, II** †

Review of current experimental work in the field of horticulture, presented by staff members, graduate and senior students. Required of all graduate and senior students in horticulture.

**485. Problems in Horticulture. Credit 1 to 4. I, II, S**

Special problems in fruit and vegetable crop production and processing. Prerequisite: Senior classification or approval of Head of Department.

## FOR GRADUATES

**601. Environmental Relations of Fruit Plants. (3-3). Credit 4. I**

Water, soil, and temperature relations of fruit plants, and their modification by management practices will receive primary consideration. Specific problems of management will be studied under field conditions.

**602. Factors Influencing Fruit Production. (3-3). Credit 4. II**

Responses of the principal fruit plants to pruning, differentiation of fruit buds, and internal and external factors influencing fruit setting will be considered in detail. The influence of growth regulators on fruit plants will receive special attention. Field and laboratory studies of important problems will receive considerable attention.

**603. Structure of Vegetable Plants. (3-3). Credit 4. II**

A consideration of the morphological and anatomical features of important families of vegetable plants and the relation of these features to growing practices and progressive improvements of the various plants.

**604. Physiology of Vegetable Plants. (3-3). Credit 4. I**

The topics of thermoperiodism, photoperiodism, nutrient deficiencies, water relations, temperature relations, fruit setting, growth, and seed germination will be taken up for each of the major vegetable crops. The recent developments in the use of hormones and selective herbicides in vegetable production will be discussed.

**681. Seminar. (1-0). Credit 1. I, II**

Intensive review and literature reporting on production and processing of horticultural crops. Development of familiarity with horticultural research literature, organizations, and personnel. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A comprehensive review of fundamental principles in research and methods employed in research. Practice in the various techniques which may be used in different investigations of horticultural problems.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in horticultural problems for thesis or dissertation.

## Structural Mechanics

**468. Statically Indeterminate Structures. (2-3). Credit 3. I**

Matrix algebra; basic structural principles; displacement analysis by the real-work, differential equation, Castigliano's first theorem, and auxiliary-load methods. Analysis of statically indeterminate structures by the consistent-distortion method. Displacements of statically indeterminate structures. Treatment of beams, trusses, frames, and curved members. Prerequisite: Aeronautical Engineering 304 or Civil Engineering 345.

**469. Analysis of Structures. (2-3). Credit 3. II**

Displacement analysis by the moment-area, elastic, weights, conjugate beam, virtual work, and Williot-Mohr methods. Analysis of statically indeterminate structures by the three-moment theorem, least-work, elastic-center, column-analogy, slope-deflection, moment-distribution, and relaxation methods. Treatment of beams, trusses, frames, and curved members. Prerequisite: Structural Mechanics 468.

### FOR GRADUATES

**601. Theory of Elasticity. (4-0). Credit 4. II**

Study of the analysis of stress and strain in two and three dimensions, equilibrium and compatability equations, strain energy methods, torsion of noncircular sections, flexure, axially symmetric problems. Prerequisite: Mathematics 601 or registration therein.

**602. Structural Stability. (4-0). Credit 4. II**

Primary buckling of centrally or eccentrically loaded columns; primary buckling of centrally loaded colums by torsion; built-up columns; lateral buckling of beams; buckling of rings. Prerequisites: Mathematics 308; approval of the instructor.

**603. Theory of Plates and Shells. (4-0). Credit 4. I, S**

Small-deflection thin plate theory for plates of various shapes and support conditions; bending of anisotropic plates; plates under combined lateral loads and in-plane forces; large-deflection thin plate theory; theory of shells; stability of plates and shells. Prerequisite: Mathematics 601 or registration therein.

**604. Vectors and Tensors in Mechanics. (2-0). Credit 2. I, S**

A unified study of continuous media using vectors and tensors.

**605. Flow and Fracture of Solids. (4-0). Credit 4. II, S**

Study of deformation of solids; elastic, very viscous, and ideally plastic substances. Prerequisite: Structural Mechanics 601.

**606. Theory of Thermal Stresses. (4-0). Credit 4. II, S**

A basic study of heat conduction, thermoelasticity, and thermoinelasticity as related to thermal stresses. Prerequisites: Structural Mechanics 601; aproval of the instructor.

**607. Matrix Methods of Structural Analysis. (3-3). Credit 4. II, S**

A unified treatment of two- and three-dimensional frames by specialized matrix methods. Prerequisite: Structural Mechanics 468.

**608. Experimental Structural Analysis. (2-3). Credit 3. II, S**

Study of observations and measurements, dimensional analysis, prediction equations, and theory of similitude; design, construction, and use of structural models. Prerequisite: Structural Mechanics 468.

**609. History of Structural Mechanics. (2-0). Credit 2. II, S**

A study of the history of the development of structural mechanics to the present time. Prerequisite: Approval of the instructor.

## Department of Veterinary Anatomy

Professor J. H. Milliff;
Associate Professors L. W. Gibbs, A. G. Kemler; Instructor R. G. Greeley

**202. Veterinary Anatomy. (1-6). Credit 3. II**

Osteology of the horse and cow. Topographical dissection of the cow. Histology of the tissues and organs of the cow. Prerequisite: Biology 107 or the equivalent.

**301. Anatomy. (0-9). Credit 3. I** ‡

The osteology, dentition, and arthrology of the domestic animals and topographical dissection of the dog.

**302. Anatomy. (0-9). Credit 3. II** ‡

Topographical dissection of the cow and a comparative study of the horse, cat, and pig. Prerequisite: Veterinary Anatomy 301.

**303. Histology. (2-6). Credit 4. I** ‡

A microscopic study of the basic tissues and of the organs, excluding the organs of reproduction.

**304. Embryology. (3-3). Credit 4. II** ‡

A microscopic study of the reproductive organs of the domestic animals, and of serial sections of chick and pig embryos. Prerequisites: Veterinary Anatomy 301, 303.

**306. Neuroanatomy. (0-6). Credit 2. II** ‡

Gross, developmental, and microscopic anatomy of the nervous system. Prerequisite: Veterinary Anatomy 303.

**501. Surgical Anatomy. (0-6). Credit 2. I** †

The anatomy of the areas of surgical and clinical importance in the domestic animals. Prerequisite: Veterinary Anatomy 302.

### FOR GRADUATES

**601. Veterinary Anatomy. (1-9). Credit 4 each semester. I, II**

The topographical dissection of domestic animals. Prerequisites: Veterinary Anatomy 301, 302.

**602. Veterinary Anatomy. (2-6). Credit 4. I, II**

The microscopic structure of the anatomical systems of domestic animals. Prerequisite: Veterinary Anatomy 303.

**603. Neuroanatomy. (2-6). Credit 4. II**

The study of the gross, developmental, and microscopic anatomy of the nervous systems of the domestic animals. Prerequisite: Veterinary Anatomy 306.

**604. History of Anatomy. (1-0). Credit 1. I, II, S**

A discussion of the biographies and contributions to the field of anatomy of the most important anatomists from 500 B.C. to the present. Prerequisite: Graduate major in veterinary anatomy.

**681. Seminar. (1-0). Credit 1. S**

The review and discussion of current scientific work in anatomy and related subjects. Prerequisite: Graduate major or minor in veterinary anatomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Problems in either gross or microscopic anatomy along lines to be chosen by the individual. Prerequisites: Veterinary Anatomy 306; approval of the Head of the Department.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on a selected thesis problem in anatomy. Prerequisite: Graduate major in veterinary anatomy.

## Department of Veterinary Medicine and Surgery

Professor M. R. Calliham,
Professors W. C. Banks, H. E. Redmond; Associate Professors J. H. Denton, Jr., E. W. Ellett, J. C. Ramge, W. M. Romane; Assistant Professors B. M. Cooley, G. M. Gowing, C. K. Jones; Instructors R. S. Titus, M. F. Young;
Lecturer A. A. Price

**416. General Surgery. (1-0). Credit 1. II**

Principles of unsoundnesses and horseshoeing. Prerequisite: Veterinary Anatomy 302.

**511. Non-Infectious Diseases of Large Animals. (3-0). Credit 3. I**

Lectures and demonstrations on physical diagnosis; diseases of the digestive, circulatory, respiratory, urinary organs; nervous system; and the skin of large animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**512. Radiology. (2-0). Credit 2. II**

Fundamentals of veterinary radiography, fluoroscopy, x-ray and radioisotope therapy with interpretation of radiographs and fluoroscopic examinations and essential protection from radiation. Prerequisites: Veterinary Microbiology 436; Veterinary Pathology 444.

**513. Non-Infectious Diseases of Small Animals. (3-0). Credit 3. I**

Non-infectious and nutritional diseases, obstetrics, pediatrics, and geriatrics of small animals, fur-bearing animals, and laboratory animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**514. Infectious Diseases of Small Animals. (2-0). Credit 2. II**

A study of the bacterial, rickettsial, viral, and protozoan diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 513.

**515. General Surgery. (4-0). Credit 4. I**

The principles of dentistry, surgery, and anesthesia of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Medicine and Surgery 416.

**516. Operative Surgery of Large Animals. (2-2). Credit 3. II**

Surgical diseases and special surgery of large animals. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**519. Clinics. (0-4). Credit 1. I**

Clinical orientation, restraint, administration of medicine, physical examination, methods of collecting specimens for laboratory purposes. Prerequisite: Veterinary Medicine and Surgery 513 and 515 or registration therein.

**520. Clinical Seminar. (0-4). Credit 1. II**

Presentation and discussion of clinical cases. Prerequisite: Veterinary Medicine and Surgery 519.

**521. Reproductive Diseases. (2-0). Credit 2. II**

A consideration of prevention and treatment of diseases incident to or affecting breeding, conception, gestation, parturition, and postparturient convalescence of common domestic animals; prevention and treatment of diseases of the newborn. Prerequisite: Veterinary Medicine and Surgery 526.

**524. Operative Surgery of Small Animals. (1-2). Credit 2. II**

Surgical procedures in small animals, including orthopedics. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**526. Obstetrics. (2-0). Credit 2. I**

Castration and spaying of farm animals, physiology of parturition, mechanics of obstetrical operations; theory and technique of artificial insemination. Prerequisite: Veterinary Physiology and Pharmacology 529 or registration therein.

**561. Clinical Laboratory Diagnosis. (0-2). Credit 1. I** †

Instruction in clinical laboratory procedures including hematology, urine analysis, radiography, and radiation therapy. Prerequisites: Veterinary Medicine and Surgery 520; Veterinary Microbiology 436.

**562. Clinical Laboratory Diagnosis. (0-2). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 561. Prerequisite: Veterinary Medicine and Surgery 561.

**563. Ambulatory Clinic. (0-4). Credit 1. I**

Under the supervision of an instructor, students are taken on calls to private farms or College herds for training and experience in the diagnosis and treatment of animal diseases under actual farm and ranch conditions. Prerequisite: Veterinary Medicine and Surgery 520.

**564. Ambulatory Clinic. (0-4). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 563. Prerequisite: Veterinary Medicine and Surgery 563.

**565. Large Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. All species of large animals are utilized. Lectures on hospital management and large animal practice and promotion are included. Prerequisite: Veterinary Medicine and Surgery 520.

**566. Large Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 565. Prerequisite: Veterinary Medicine and Surgery 565.

**567. Small Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. Detailed studies of hospital planning, practice management, and promotion and veterinary ethics are included. Prerequisite: Veterinary Medicine and Surgery 520.

**568. Small Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 567. Prerequisite: Veterinary Medicine and Surgery 567.

**569. Veterinary Clinics. (0-6). Credit 2. S**

Veterinary clinics. Prerequisite: Veterinary Medicine and Surgery 520.

## FOR GRADUATES

**603. Veterinary Surgery. Credit 1 to 8 each semester. I, II**

Special surgery of large or small animals. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**612. Diagnostic Radiology. Credit 2 or 3 each semester. I, II, S**

Radiographic interpretation of large and small animals with special emphasis on film reading. The use of special techniques including contrast media as diagnostic aids will be discussed and demonstrated. Prerequisite: Degree of Doctor of Veterinary Medicine.

**685. Problems. Credit 1 to 8 each semester. I, II**

Original investigations of problems in the field of surgery, therapeutics, or radiology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis.

## Department of Veterinary Microbiology

Professor L. C. Grumbles;
Associate Professors A. I. Flowers, C. F. Hall, P. F. Jungerman;
Assistant Professor R. W. Moore

**301. Microorganisms in Animal Diseases. (1-4). Credit 2. I**

A study of the function of microorganisms in maintaining health and causing diseases in domestic animals. Rumen microflora. Preservation and spoilage of meat. Methods by which infectious diseases are transmitted and prevented. A study of selected groups of pathogens and specific diseases. Prerequisite: Biology 206.

**334. Poultry Diseases. (2-2). Credit 3. II**

Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic, and contagious diseases. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323.

**435. Microbiology and Immunology. (3-4). Credit 4. I** ‡

The principles of microbiology and immunology. Emphasis is placed on the general morphology, physiology, and immunologic reactions of microorganisms important in veterinary medicine. Special attention is given to the biologics in the diagnosis and treatment of infectious diseases. Prerequisite: Second year classification in veterinary medicine.

**436. Pathogenic Microbiology. (3-3). Credit 4. II** ‡

A study of the general staining procedures, cultural methods and media preparation for bacteria; and the morphology, cultural characteristics, and pathogenicity of microorganisms which produce diseases in domestic animals and man. Prerequisite: Veterinary Microbiology 435.

**485. Problems. Credit 1 to 3. I, II, S**

A directed, individual study of a selected problem in veterinary microbiology approved by the instructor. Prerequisite: Approval of the Head of the Department.

**595. Poultry Diseases. (2-2). Credit 3. I**

The pathology of diseases of poultry will be considered from clinical, pathological, microbiological, and parasitological standpoints. Prevention, control, and treatment will also be given consideration. Prerequisite: Senior classification in veterinary medicine.

**596. Poultry Diagnosis. (0-2). Credit 1. II**

Clinical laboratory diagnosis of poultry diseases. Prerequisite: Veterinary Microbiology 595.

### FOR GRADUATES

**643. Veterinary Microbiology. (3-4). Credit 4. I, II**

A study of the pathogenic microorganisms; their cultural and biological characteristics and pathogenicity.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**646. Avian Virus Diseases. Credit 1 to 4. I, II**

A study of the viral diseases of poultry including methods of isolation and identification of the causative agents. Practice consists of conducting post mortem examinations and special diagnostic procedures on birds received daily for necropsy. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**647. Veterinary Virology. Credit 1 to 4. I, II**

A detailed study of virus infections in animals, including types of infections, mode of transmission, intracellular pathology, epidemiology, isolation and identification of the inciting agents. Practice includes tissue cultivation, animal inoculations, and diagnostic tests. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Veterinary Mycology. Credit 1 to 4. II, S**

A study of actinomycetes, yeasts, and molds that are pathogenic to man and animals; the morphology, cultural characteristics, pathogenicity and identification. Practice consists of exercises in cultural methods, morphological characteristics, biochemical reactions and diagnosis. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in microbiology. Prerequisite: Degree of Doctor of Veterinary Medicine. (May be taken for undergraduate credit with permission of the Head of the Department.)

**691. Research. Credit 1 to 8. I, II**

An original problem in veterinary microbiology. This research to be reported by a thesis as partial requirement for the Master of Science degree. Prerequisite: Admission to candidacy for Master of Science degree.

## Department of Veterinary Parasitology

Professor R. D. Turk;
Associate Professor R. R. Bell; Assistant Professor T. J. Galvin

**483. Parasites of Domestic Animals. (2-2). Credit 3. I** ‡

Internal parasites of domestic animals. Symptoms, diagnosis, treatment, control, and eradication of parasitic diseases are emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized. Prerequisite: Veterinary Anatomy 302.

**484. Parasites of Domestic Animals. (2-2). Credit 3. II** ‡

Internal parasites of farm, pet, and fur-bearing animals. Attention is given to symptoms, diagnosis, treatment, control, and eradication of parasitic diseases. Practice consists of laboratory and diagnostic methods used in parasitology; the pathology of parasitism. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized in the laboratory. Prerequisite: Veterinary Parasitology 483.

**487. Parasites of Farm Animals and Poultry. (2-2). Credit 3. II, S** †

A study of some of the more important internal and external parasites of domestic animals and poultry. The life cycles, pathogenicity, and economic and public health aspects will be stressed with suggested methods for control. Open to agricultural students. Prerequisite: Senior classification.

**583. Clinical Parasitology. (0-2). Credit 1. I**

Diagnosis of parasitic diseases is emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Prerequisite: Veterinary Parasitology 484.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**584. Clinical Parasitology. (0-2). Credit 1. II**

Diagnosis of parasitic diseases including physical examination of patients and such laboratory procedures as are indicated. Prerequisite: Veterinary Medicine and Surgery 519.

### FOR GRADUATES

**601. Parasitology. Credit 1 to 4 each semester. I**

A detailed study of the more important helminth parasites of domestic animals, including their identification, distribution, and life history. Prerequisite: Veterinary Parasitology 584 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Special problems concerned with the parasites of domestic animals or poultry. Prerequisites: Veterinary Parasitology 601 or the equivalent; approval of the instructor.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

## Department of Veterinary Pathology

Professor C. H. Bridges;
Associate Professors J. N. Beasley*, D. O. N. Taylor; Assistant Professors F. A. Fear, W. F. Mestanza, K. R. Pierce; Instructor J. E. Hall

**443. General Pathology. (4-3). Credit 5. I**

The elementary disease processes and their causes, including a study of the gross and minute appearance of the diseased tissue. Such processes as inflammation, necrosis, gangrene, atrophy, hypertrophy, ulceration, the various degenerations, infiltrations, pigmentations, and tumor formations are considered. Practice consists of the microscopic study of these processes and instruction in laboratory technique. Prerequisites: Veterinary Anatomy 302, 304.

**444. Special Pathology. (5-3). Credit 6. II**

Lectures on special pathology of organs and systems. Infectious and noninfectious diseases are considered. The mechanism of development of lesions and their relationship to clinical symptoms are emphasized. Lectures are illustrated liberally with color slides. Laboratory work consists of studies in gross and microscopic pathology. Prerequisite: Veterinary Pathology 443.

**447. General Principles of Pathology. (2-2). Credit 3. I, S** †

A study of the mechanisms of disease as encountered in the higher mammalian species. The course deals with the causes and pathogenesis of the various types of disease, the reactions of the body against them, and certain abstract principles governing their treatment. Open to non-medical students. Lectures and demonstrations. Prerequisites: Six hours of biological sciences; junior classification.

**577. Applied Pathology. (0-2). Credit 1. I**

Pathology as directly applied to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**578. Applied Pathology. (0-2). Credit 1. II**

Pathology as applied directly to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**585. Problems in Pathology. Credit 1 to 4 each semester. I, II, S**

An elective course for undergraduates who wish to supplement the standard required courses. Problems can be assigned in gross or microscopic pathology or in pathological technique. Prerequisites: Veterinary Pathology 443; approval of the instructor.

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*On leave of absence from 9-1-61 to 8-31-62.

## FOR GRADUATES

**643. Gross Pathology. Credit 1 to 6. I, II, S**

The student studies gross pathological changes at the necropsies performed daily. He then follows selected tissues through suitable histopathological techniques and corrects his gross diagnoses in the light of the microscopic findings. Confirmatory bacteriologic methods are utilized where indicated. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**644. Locomotor and Skeletal Diseases. Credit 1 or 2. I, S**

The changes taking place in diseased bones, joints, and muscles are studied with respect to their nature and probable causes, and with special reference to lameness of the horse. Frequent use is made of the unsurpassed Mark Francis Collection of Bone and Joint Pathology. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**645. Neoplastic Diseases. Credit 1 to 8. I, II, S**

Theoretical, histopathological, and clinical aspects of neoplasms. Diagnosis of neoplastic and related conditions in all species. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**646. Nutritional Diseases. Credit 2 to 4. II**

Gross and microscopic tissue changes to be found in experimentally produced nutritional deficiencies are considered in comparison with clinically encountered deficiencies and with other conditions from which they must be differentiated. Prerequisite: Degree of Doctor of Veterinary Medicine or other suitable preparation.

**647. Metabolic Diseases. Credit 1 or 2. S**

The pathology of diseases due to major disorders of metabolism, non-nutritional and non-infectious. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Reproductive Diseases. Credit 1 to 4. S**

Theoretical and practical pathology of gross and microscopic lesions in the reproductive organs with especial reference to bovine sterility. Prerequisites: Degree of Doctor of Veterinary Medicine or equivalent.

**649. Gross Post-Mortem Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in recognition, interpretation, and description of tissue changes encountered. Specific diagnoses are derived and defended. Prerequisites: At least 4 semester hours of credit in Veterinary Pathology 643.

**650. Neuropathology of Animals. Credit 1 to 4. I, S**

In addition to the study and interpretation of gross and microscopic lesions of the central and peripheral nervous systems, major attention is given in theory and in practice to the special laboratory techniques necessary to demonstrate such lesions. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**651. Microscopic Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in diagnosis, applied especially to the "problem" cases currently encountered in the Department's pathological diagnostic service. Routine and special histopathological methods are employed. Prerequisites: A total of at least 10 semester hours of credit in Veterinary Pathology 643, 645.

**658. Pathological Technique. Credit 1 to 6. I, II, S**

The art and science of preparing animal tissues, fluids, and exudates for microscopic or other special examination. Enrollment is limited to the number who can be accommodated in the routine of the departmental laboratory. Prerequisite: A fair knowledge of general chemistry.

**659. Sheep Diseases. Credit 1 to 4. I**

The pathology, etiology, and symptomatology of the economically important diseases affecting sheep in all of the major sheep-producing countries of the world. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**691. Research. Credit 1 or more each semester. I, II, S**

Research to be reported by the writing of a thesis or dissertation as a partial requirement for the Master of Science or Doctor of Philosophy degree.

## Department of Veterinary Physiology and Pharmacology

Professor P. W. Burns;
Associate Professor R. H. Davis, Jr.; Assistant Professor J. D. McCrady

**323. Physiology of Farm Animals. (2-2). Credit 3. II**

A consideration of physiology essential to an understanding of disease of farm animals. For students in agriculture. Prerequisites: Chemistry 228 or 231; Veterinary Anatomy 202.

**326. Physiology. (4-3). Credit 5. II** ‡

Introduction to physiology. Dynamics of nerve and muscle. Functions of the circulatory and respiratory systems. Renal function and body fluids. Mechanisms of digestion, absorption, and excretion. Prerequisites: Biochemistry and Nutrition 312; Veterinary Anatomy 301, 303, registration in 302, 304, 306.

**427. Physiology. (2-6). Credit 4. I** ‡

Metabolism and energy exchange. Minerals and vitamins. Functions of the nervous, endocrine, and reproductive systems. Milk secretion and growth. Prerequisite: Veterinary Physiology and Pharmacology 326.

**428. Pharmacology. (3-0). Credit 3. II**

Pharmacologic principles; central nervous system depressants and stimulants; local anesthetics; autonomic drugs; skeletal muscle relaxants; antihistamines. Prerequisite: Veterinary Physiology and Pharmacology 427.

**529. Pharmacology. (2-3). Credit 3. I**

Cardiovascular drugs; hematologic agents; diuretics; locally acting drugs; gastrointestinal agents; drugs used in metabolic disorders, hormones; local and systemic anti-infectives; parasiticides. Practice consists of the study of the action of drugs on experimental animals. Prerequisite: Veterinary Physiology and Pharmacology 428.

**530. Toxicology. (2-2). Credit 3. II**

Occurrence, signs, lesions, treatment, prevention, and management of poisoning by inorganic and organic poisons. Clinical manifestations, lesions and management of animals affected by poisonous plants. Practice consists of actions and treatment of poisons in experimental animals; chemical detection of some of the more common inorganic and organic poisons. Prerequisite: Veterinary Physiology and Pharmacology 529.

**573. Pharmacy. (0-2). Credit 1. I**

Principles of pharmacy; preparing, compounding, and dispensing medicines. Prerequisite: Veterinary Physiology and Pharmacology 529.

**574. Pharmacy. (0-2). Credit 1. II**

A continuation of Veterinary Physiology and Pharmacology 573. Prerequisite: Veterinary Physiology and Pharmacology 573.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

### FOR GRADUATES

**601, 602. Animal Physiology. (3-3). Credit 4 each semester. I, II**

Recent phases of physiology; modern experimental methods. The work is arranged to suit the needs of the student and in harmony with his previous training. Prerequisite: Basic courses in morphology and organic chemistry.

**605, 606. Veterinary Toxicology. (3-3). Credit 4 each semester. I, II**

Original investigations and detailed studies of poisons or poisonous plants and their effects on domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 530.

**607, 608. Veterinary Pharmacology. (3-3). Credit 4 each semester. I, II**

Modern methods of research in pharmacology and pharmaceutical processes. Original research in studying the actions and uses of drugs. Prerequisites: Veterinary Physiology and Pharmacology 428, 529.

**611, 612. Veterinary Physiology. (3-3). Credit 4 each semester. I, II**

A detailed study of specific phases of physiology of domestic animals. Prerequisites: Veterinary Anatomy 303, 304; Veterinary Physiology and Pharmacology 427.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems in physiology, pharmacology, or toxicology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Original investigations in veterinary physiology, pharmacology, or toxicology to be submitted by writing of a thesis as partial fulfillment for the Master of Science degree. Prerequisite: Approval of Head of Department.

## Department of Veterinary Public Health

Professor F. P. Jaggi, Jr.;
Assistant Professor L. H. Russell, Jr.; H. G. Osborne, Visiting Professor and Centennial Lecturer

**491. Animal Hygiene. (2-2). Credit 3. I, II**

This course deals with livestock sanitation and the prevention, control, and eradication of diseases of farm and ranch animals. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323; senior classification in agriculture.

**533. Food Hygiene. (1-2). Credit 2. I**

The inspection of foods of animal origin with special emphasis on milk; laws, ordinances, and regulations governing animal food products including sanitary standards and animal health requirements. Prerequisite: Junior classification in veterinary medicine.

**536. Infectious Diseases of Large Animals. (5-0). Credit 5. II**

A study of the bacterial, rickettsial, viral, and protozoal diseases of farm and ranch animals (bovine, equine, ovine, caprine, and porcine). Public health aspects of the various intertransmissible diseases of animal and man are stressed. Prerequisite: Junior classification in veterinary medicine.

**591. Food Hygiene. (2-2). Credit 3. I**

A continuation of Veterinary Public Health 533 with special emphasis on meat. Required field trips. Prerequisite: Senior classification in veterinary medicine.

**592. Public Health. (2-2). Credit 3. II**

The relation of the veterinarian and veterinary problems to public health. Required field trips. Prerequisite: Veterinary Public Health 591.

### FOR GRADUATES

**601. Food Hygiene. (3-4). Credit 4. I**

The study of causes and evidence of spoilage, and the detection of adulterants in fresh, canned, and cured foods of animal origin. Prerequisite: Veterinary Public Health 591 or 592.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in veterinary public health. Prerequisite: Degree of Doctor of Veterinary Medicine.

## Department of Wildlife Management

Professor W. B. Davis;
Associate Professors R. J. Baldauf, R. B. Davis, O. C. Wallmo;
Instructors D. C. Carter, J. M. Inglis

**201. Wildlife Conservation and Management. (3-0). Credit 3. I, II**

An introduction to the wildlife and fishery resources of the United States with special reference to Texas. The importance of plants and animals in our economic and cultural life. An account of what has happened to North American wildlife with consideration of specific plans and methods for its rehabilitation, maintenance, and increase.

**202. Natural History of the Vertebrates. (2-2). Credit 3. II**

Natural history of fishes, amphibians, reptiles, birds and mammals, as exemplified by selected representatives of each group. Not open to wildlife management majors.

**300. Field Studies. Credit 3. S**

Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates; experience in collecting and preparing study skins of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Head of Department.

**304. Conservation and Management of Fishes. (3-0). Credit 3. II**

The classification, habits, economic importance, and conservation of fishes. Not open to wildlife management majors.

**311. Ichthyology. (Fresh Water). (2-3). Credit 3. I** †

This course is designed to familiarize the student with the fresh-water fishes of the world. The approach to the subject matter will be mainly systematic, but the evolution, ecology, life history, and economy of the more important species will be treated. The fresh-water fishes of Texas will be emphasized and the practice will consist of the identification of 75-100 fish. Prerequisite: Biology 107.

**312. Ichthyology. (Marine). (2-3). Credit 3. II** †

A study of the marine fishes of the world, emphasizing fishes of Texas. Life history, ecology, distribution, evolution, and economic values of important species will be treated. Prerequisite: Biology 107. (Offered in 1961-62 and in alternate years thereafter.)

**315. Herpetology. (2-2). Credit 3. II** †

An introduction to the study of the structure, adaptation, classification, distribution, and economic importance of amphibians and reptiles. Prerequisite: Biology 107.

**316. Field Herpetology. (0-3). Credit 1. II**

Field work involving the collection and preservation of herpetological specimens; natural history; ecological relations. Prerequisites: Wildlife Management 315 or registration therein.

**400. Fisheries Survey. Credit 4. S**

A field course. Attention will be given to the life histories, ecology, and propagation of fishes important for sporting and food purposes. Distribution, identification, and field techniques. Prerequisite: Junior classification or approval of Head of Department.

**401. General Mammalogy. (2-2). Credit 3. I** †

Study of the structure, classification, and economic relations of mammals. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**402. General Ornithology. (2-2). Credit 3. II** †

Introduction to the study of birds, their structure, classification, geographic distribution, ecologic relations, and economic status. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**403. Animal Ecology. (2-3). Credit 3. I** †

Composition, structure, and energy relationships of plant-animal communities. The interaction of physical and biotic factors as they affect population levels and community development. Application of ecological principles to some current land use practices. Prerequisite: Range and Forestry 301.

**408. Techniques of Wildlife Management. (2-3). Credit 3. II** †

Methods and techniques in maintaining and increasing desirable wildlife and regulating population generally, with emphasis on practical aspects. Use of natural vegetation, the place and methods of census, restocking, game preserves, predatory animal control, provision of food and cover, farmer-sportsman relations, significance of succession, and other ecologic concepts to game management and related enterprises. Prerequisite: Senior classification in wildlife management or approval of instructor.

**410. Conservation and Management of Fishes. (3-0). Credit 3. II** †

Basic knowledge from ichthyology, biology of fishes, and limnology is related to the applied aspects of fresh water and marine fishery science. Emphasis is placed on methods of fish culture, habitat and population manipulation, disease and parasites of fishes and fundamentals of farm pond management.

**417. Biology of Fishes. (2-2). Credit 3. I** †

Treats the biology of fishes, including respiration, sense organs, feeding habits, breeding habits, anatomy, and adaptations to the environment. Emphasis will be placed upon the various physiological and morphological features of fishes, particularly as they relate to problems of distribution, populations, and management in Texas. Prerequisite: Biology 107. (Offered in 1961-62 and in alternate years thereafter.)

**485. Wildlife Problems. Credit 1 to 3. I, II, S**

Individual study and research on a selected problem approved by the instructor. Prerequisite: Junior or senior classification.

## FOR GRADUATES

**601, 602. Vertebrate Systematics. (1-6). Credit 3 each semester. I, II**

The theory and practice of taxonomy as applied to vertebrates. Laboratory consists of individual problems on classification and distribution of selected groups of vertebrates; problems in nomenclature of birds, mammals, fishes and reptiles, based on Texas Cooperative Wildlife Collection. Survey of the literature of vertebrate taxonomy as related to the group selected; a study of vertebrate material from the systematic standpoint. Prerequisites: Wildlife Management 311, 315, 401, or 402, depending on group selected. (Offered in 1962-63 and in alternate years thereafter.)

**603. Vertebrate Ecology. (1-6). Credit 3. II**

The ecology and life histories of vertebrates with special reference to birds and mammals. The role of native vertebrates in relation to range, forest, and farm problems. Considerations will be given to community and environmental relations. Prerequisite: Wildlife Management 403 or equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**608. Techniques of Wildlife Management. (2-0). Credit 2. II**

Special techniques and current development in wildlife management practices. Prerequisite: Wildlife Management 408 or equivalent. (Offered in 1962-63 and in alternate years thereafter.)

**609. Wildlife Research Methods. (2-0). Credit 2. I**

A study of research methods as applied to wildlife management. (Offered in 1962-63 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the wildlife field with special reference to the literature. Prerequisite: Senior or graduate classification.

**685. Problems. Credit 2 to 6 each semester. I, II, S**

Credit to be adjusted in accordance with requirements of each individual case.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on selected wildlife problem to be used in thesis or dissertation.

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## RECORD OF SESSION 1959-60

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## SUMMER SESSION 1960

### JUNE 1960

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| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 |  |  |

### JULY 1960

| S | M | T | W | T | F | S |
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| 10 | 11 | 12 | 13 | 14 | 15 | 16 |
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| 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 |  |  |  |  |  |  |

### AUGUST 1960

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
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| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 |  |  |  |

**June 6, Monday**
Registration for the first term, 8 a.m. to 12 noon.

**June 7, Tuesday**
Beginning of classes, 7 a.m.

**June 9, Thursday**
Last day for enrolling in the College for the first term.

**June 10, Friday**
Last day for making changes in registration.

**July 15, Friday**
First term final examinations.

**July 18, Monday**
Registration for the second term, 8 a.m. to 12 noon.

**July 19, Tuesday**
Beginning of classes, 7 a.m.

**July 21, Thursday**
Last day for enrolling in the College for the second term.

**July 22, Friday**
Last day for making changes in registration.

**August 26, Friday**
Second term final examinations.

## FALL SEMESTER 1960

### SEPTEMBER 1960

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
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| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 |  |

### OCTOBER 1960

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
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| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | 31 |  |  |  |  |  |

### NOVEMBER 1960

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
|  |  | 1 | 2 | 3 | 4 | 5 |
| 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 13 | 14 | 15 | 16 | 17 | 18 | 19 |
| 20 | 21 | 22 | 23 | 24 | 25 | 26 |
| 27 | 28 | 29 | 30 |  |  |  |

**September 13, Tuesday**
Arrival of entering freshmen on the campus.

**September 14-15, Wednesday-Thursday**
New Student Program.

**September 16-17, Friday-Saturday**
Registration for the fall semester, 8 a.m. to 5 p.m.

**September 19, Monday**
Beginning of classes, 8 a.m.

**September 24, Saturday**
Last day for enrolling in the College for the fall semester or for adding new courses.

**October 1, Saturday**
Last day for dropping courses with no grade.

**November 5, Saturday**
Official Corps Trip.

**November 14, Monday**
Mid-semester grade reports.

**November 24-27, Thursday-Sunday, inclusive**
Thanksgiving holidays.

**December 17, Saturday**
Beginning of Christmas recess, 12 noon.

# CALENDAR
# 1961

**January 2, Monday**
End of Christmas recess, 8 a.m.

**January 21, Saturday**
Commencement.

**January 23, Monday**
First day of semester examinations.

**January 28, Saturday**
Last day of semester examinations.

### DECEMBER 1960

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

## SPRING SEMESTER 1961

**February 1, Wednesday**
Arrival of entering freshmen on the campus.

**February 3-4, Friday-Saturday**
Registration for the spring semester, 8 a.m. to 5 p.m.

**February 6, Monday**
Beginning of classes, 8 a.m.

**February 11, Saturday**
Last day for enrolling in the College for the spring semester or for adding new courses.

**February 18, Saturday**
Last day for dropping courses with no grade.

**February 20, Monday**
Beginning of Religious Emphasis Week.

**February 24, Friday**
End of Religious Emphasis Week.

**March 27, Monday**
Mid-semester grade reports.

**March 29, Wednesday**
Beginning of spring recess, 5 p.m.

**April 4, Tuesday**
End of spring recess, 8 a.m.

**May 27, Saturday**
Commencement and Final Review.

**May 29, Monday**
First day of semester examinations.

**June 3, Saturday**
Last day of semester examinations.

### JANUARY 1961

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 8 | 9 | 10 | 11 | 12 | 13 | 14 |
| 15 | 16 | 17 | 18 | 19 | 20 | 21 |
| 22 | 23 | 24 | 25 | 26 | 27 | 28 |
| 29 | 30 | 31 | | | | |

### FEBRUARY 1961

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | | | | |

### MARCH 1961

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | 1 | 2 | 3 | 4 |
| 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| 12 | 13 | 14 | 15 | 16 | 17 | 18 |
| 19 | 20 | 21 | 22 | 23 | 24 | 25 |
| 26 | 27 | 28 | 29 | 30 | 31 | |

### APRIL 1961

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | | | | | | 1 |
| 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| 16 | 17 | 18 | 19 | 20 | 21 | 22 |
| 23 | 24 | 25 | 26 | 27 | 28 | 29 |
| 30 | | | | | | |

### MAY 1961

| S | M | T | W | T | F | S |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 7 | 8 | 9 | 10 | 11 | 12 | 13 |
| 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 |
| 28 | 29 | 30 | 31 | | | |

## The Texas Agricultural and Mechanical College System

Composed of all colleges, agencies and services under the supervision of the Board of Directors of the Agricultural and Mechanical College of Texas, including:

- The Agricultural and Mechanical College of Texas
- The Arlington State College
- The Tarleton State College
- The Prairie View Agricultural and Mechanical College
- The Texas Agricultural Experiment Station
- The Texas Agricultural Extension Service
- The Texas Forest Service
- The Texas Engineering Experiment Station
- The Texas Engineering Extension Service
- The Texas Transportation Institute

## Board of Directors

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| PRICE CAMPBELL, *Utilities Executive* | Abilene |
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| JOHN C. CALHOUN, JR. | *Vice Chancellor for Engineering* |
| R. H. SHUFFLER | *Director of Information and Publications* |
| W. C. FREEMAN | *Comptroller* |
| T. R. SPENCE | *Manager of Physical Plants* |

# The Agricultural and Mechanical College of Texas

## Administrative Officers

| | |
|---|---|
| Earl Rudder, B.S. | *President* |
| J. Boyd Page, Ph.D. | *Dean of the College and of the Graduate School* |
| Fred J. Benson, M.S. | *Dean, School of Engineering* |
| Frank W. R. Hubert, Ph.D. | *Dean, School of Arts and Sciences* |
| Alvin A. Price, D.V.M., M.S. | *Dean, School of Veterinary Medicine* |
| G. M. Watkins, Ph.D. | *Dean, School of Agriculture* |
| James P. Hannigan, B.S. | *Dean of Students* |
| H. Lloyd Heaton, M.S. | *Director of Admissions and Registrar* |
| Charles A. Roeber, B.A., B.B.A. | *Business Manager* |

# FACULTY

(Correct as of February 1, 1960.)

## ACADEMIC COUNCIL

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

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Rudder, James Earl, President of the College. (1958, 1959)

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1945)

Adriance, Guy Webb, Professor of Horticulture. (1921, 1935)

Benson, Fred Jacob, Dean of the School of Engineering. (1947, 1957)

Burchard, Donald Dix, Professor of Journalism. (1948)

Burgess, Archie Rostron, Professor of Industrial Engineering. (1948, 1950)

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology. (1926, 1935)

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry. (1947, 1956)

Calaway, Paul Kenneth, Professor of Chemistry. (1957)

Calhoun, John C., Jr., Vice Chancellor for Engineering and Professor of Petroleum Engineering. (1955, 1959)

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery. (1958)

Chalk, Alfred Franklin, Professor of Economics. (1936, 1956)

Cochran, Robert Glenn, Professor of Nuclear Engineering. (1959)

Crawford, Charles William, Associate Dean of Engineering. (1919, 1957)

Cronk, Alfred Edward, Professor of Aeronautical Engineering. (1956)

Darrow, Robert Arthur, Professor of Range and Forestry. (1948, 1959)

Davis, Joe Eugene, Colonel, Inf., U.S.A.R., Commandant of the School of Military Sciences. (1930, 1951)

Davis, William B., Professor of Wildlife Management. (1937, 1946)

DeWerth, Adolphe Ferdinand, Professor of Floriculture and Landscape Architecture. (1946, 1949)

Doak, Clifton Childress, Professor of Biology. (1926, 1937)

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)

Gaines, J. C., Professor of Entomology. (1947, 1952)

Godbey, Chauncey Barger, Professor of Genetics. (1926, 1946)

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)

Groneman, Chris Harold, Professor of Industrial Education. (1940, 1942)

Grumbles, Leland Creed, Professor of Veterinary Microbiology. (1949, 1957)

Hall, Wayne C., Professor of Plant Physiology and Pathology. (1949, 1958)

Hallmark, Glen Duncan, Professor of Electrical Engineering. (1942, 1957)

Hannigan, James P., Dean of Students. (1959)

Harrington, Marion Thomas, Chancellor. (1924, 1953-1957, 1959)

Hobgood, Price, Professor of Agricultural Engineering. (1939, 1958)

Holleman, Theo Rufus, Professor of Architecture. (1946, 1957)

Houze, Robert Alvin, Library Director. (1949, 1957)

Hubert, Frank William R., Dean of the School of Arts and Sciences. (1959)

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health. (1937, 1957)

Klipple, Edmund Chester, Professor of Mathematics. (1935, 1952)

Leipper, Dale F., Professor of Oceanography. (1949)

Leland, Thomas William, Professor of Business Administration. (1922, 1926)

Lindsay, James Donald, Professor of Chemical Engineering. (1938, 1946)

Lyman, Carl M., Professor of Biochemistry and Nutrition. (1940, 1949)

Lynch, Shirley Alfred, Professor of Geology. (1946)

Lyons, Charles Roger, Director of Student Health. (1956, 1957)

Milliff, John Henry, Professor of Veterinary Anatomy. (1936, 1941)

Morgan, Stewart Samuel, Professor of English. (1921, 1952)

Myers, James Arthur, Athletic Director. (1958)

Nance, Joseph Milton, Professor of History and Government. (1941, 1958)

Page, John Boyd, Dean of the College and of the Graduate School. (1950, 1957)

Parker, Grady P., Professor of Education. (1940, 1954)

Patterson, Raleigh Elwood, Vice Chancellor for Agriculture. (1958, 1959)

*Potter, James Gregor, Professor of Physics. (1945)

Potts, Richard Carmechial, Assistant Dean of Agriculture. (1936, 1956)

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)

Quisenberry, John Henry, Professor of Poultry Science. (1936, 1946)

Ransdell, Clifford Howell, Associate Director of the Basic Division. (1937, 1956)

Roeber, Charles Arthur, Business Manager. (1929, 1954)

Rupel, Isaac Walker, Professor of Dairy Science. (1945)

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences and Professor of Geography. (1934, 1959)

Simmang, Clifford Max, Professor of Mechanical Engineering. (1938, 1957)

Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)

Street, William Ezra, Professor of Engineering Drawing. (1941)

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*On leave of absence.

**Timm,** Tyrus Raymond, Professor of Agricultural Economics and Sociology. (1947, 1953)

**Tishler,** Carl Edward, Professor of Health and Physical Education. (1941, 1947)

**Trogdon,** William O., Professor of Agronomy. (1958)

*__Trotter,__ Ide Peebles, Associate Dean of the Graduate School. (1936, 1956)

**Turk,** Richard Duncan, Professor of Veterinary Parasitology. (1944)

**Walton,** Ernest Vernon, Professor of Agricultural Education. (1946, 1953)

**Watkins,** Gustav McKee, Dean of the School of Agriculture. (1949, 1958)

**Weekes,** Donald Fessenden, Professor of Physics. (1937, 1959)

**Whiting,** Robert Louis, Professor of Petroleum Engineering. (1946, 1954)

**Woolket,** Joseph John, Professor of Modern Languages. (1925, 1945)

**Wright,** Samuel Robert, Professor of Civil Engineering. (1923, 1946)

**Zinn,** Bennie A., Director of the Department of Student Affairs. (1945, 1954)

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*Retired January 16, 1960.

## GENERAL FACULTY

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Abbott, John Paul, Distinguished Professor of English. (1926, 1956)
B.A., Vanderbilt, 1925; Ph.D., Iowa, 1939.

Adams, William Floyd, Associate Professor of Engineering Drawing. (1944, 1953)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1954; Reg. Prof. Engr.

Adamson, Arthur Douglas, Professor of Health and Physical Education. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1944.

Adkins, William Gray, Associate Professor of Agricultural Economics and Rural Sociology. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1953.

Adkisson, Perry L., Associate Professor of Entomology. (1958)
B.S., Arkansas, 1950; M.S., 1954; Ph.D., Kansas State College, 1956.

Adriance, Guy Webb, Professor of Horticulture and Head of Department. (1921, 1935)
B.S., Agricultural and Mechanical College of Texas, 1915; M.S., California, 1917; Ph.D., Michigan State College, 1929.

Albritton, Oscar Willard, Assistant Professor of Mechanical Engineering. (1956, 1958)
B.S., Texas College of Mines and Metallurgy, 1951; M.S., Agricultural and Mechanical College of Texas, 1958; Reg. Prof. Engr.

Aldred, William Hughes, Assistant Professor of Agricultural Engineering. (1953, 1957)
B.S., Georgia, 1951; M.S., Agricultural and Mechanical College of Texas, 1956.

Alexander, Robert Benjamin, Associate Professor of Chemistry. (1952, 1959)
B.A., Baylor, 1945; M.A., 1946; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Allen, David Edward, Captain, Assistant Professor of Air Science. (1958)
B.S., United States Naval Academy, 1953.

Alter, Alan Brian, Assistant Professor of Mechanical Engineering. (1949, 1952)
B.S., Pittsburgh, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Amyx, James William, Professor of Petroleum Engineering. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1946; M.Eng., 1956; Reg. Prof. Engr.

Anderson, Carl Gustaf, Jr., Assistant Professor of Agricultural Education. (1960)
B.S., Agricultural and Mechanical College of Texas, 1958; M.S., Louisiana State, 1960.

Anderson, John Quincey, Professor of English. (1953, 1959)
A.B., Oklahoma Agricultural and Mechanical College, 1939; M.A., Louisiana State, 1948; Ph.D., North Carolina, 1952.

Andrews, Paul Milton, Associate Professor of Health and Physical Education. (1943, 1951)
B.S., Sul Ross State Teachers College, 1934; M.Ed., Agricultural and Mechanical College of Texas, 1945.

Ashcraft, Allan Coleman, Instructor of History. (1956)
B.A., Agricultural and Mechanical College of Texas, 1950; M.A., Columbia, 1951.

Ashworth, Lee J., Jr., Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., California, 1951; M.S., 1954; Ph.D., 1958.

Atkins, Irvin Milburn, Professor of Agronomy (Agricultural Research Service, USDA, cooperating). (1939, 1954)
B.S., Kansas State College, 1928; M.S., 1936; Ph.D., Minnesota, 1945.

Atkinson, Robert Leon, Assistant Professor of Poultry Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950; Ph.D., California, 1958.

Atwater, William Felix, Captain, Assistant Professor of Air Science. (1958)
B.S., Berea College, 1949; M.A., George Peabody College for Teachers, 1950.

Bader, Richard George, Associate Professor of Oceanography. (1955, 1956)
B.S., Maine, 1948; S.B., Chicago, 1949; M.S., 1950; Ph.D., 1952.

Bailey, Kenneth Ralph, Assistant Professor of Mathematics. (1946, 1954)
B.A., Texas, 1937; M.A., 1941.

Baldauf, Richard John, Associate Professor of Wildlife Management. (1952, 1959)
B.S., Albright College, 1949; M.S., Agricultural and Mechanical College of Texas, 1951; Ph.D., 1956.

Ball, Billie Joe, Instructor of Electrical Engineering. (1959)
B.S., Mississippi State, 1956; M.S., 1959.

Ballinger, Richard Henry, Professor of English. (1954, 1957)
B.A., Texas, 1936; M.A., 1936; Ph.D., Harvard, 1953.

Banks, William Carl, Professor of Veterinary Medicine and Surgery. (1941, 1955)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Bardell, North Bruce, Jr., Assistant Professor of Engineering Drawing. (1953, 1957)
B.S., Agricultural and Mechanical College of Texas, 1953.

Barker, Donald Gene, Assistant Professor of Psychology. (1959)
B.A., Baylor, 1952; M.A., 1954.

Barker, Palmer Winfield, Associate Professor of Physics. (1946, 1949)
B.S., Missouri, 1932; M.A., 1933.

Barnard, Herbert Marvin, Instructor of Electrical Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1955.

Barnard, William Francis, Jr., Lieutenant Colonel, Associate Professor of Air Science. (1957)
B.S., Virginia Military Institute, 1939.

Barnes, Stanley Louis, Instructor of Meteorology. (1959)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1959.

Barzak, Robert William, Assistant Professor of English. (1955, 1958)
B.A., Agricultural and Mechanical College of Texas, 1949; M.A., Illinois, 1951; Ph.D., 1959.

Bashaw, Elexis C., Geneticist of Agricultural Research Service, USDA. (1951, 1955)
B.S., Purdue, 1947; M.S., 1948; Ph.D., Agricultural and Mechanical College of Texas, 1954.

Bass, Daniel Materson, Jr., Associate Professor of Petroleum Engineering. (1954, 1958)
B.S., Louisiana State, 1950; M.S., Agricultural and Mechanical College of Texas, 1955; Reg. Prof. Engr.

Bass, James Horace, Professor of History. (1940, 1955)
B.A., North Texas State Teachers College, 1924; M.A., Texas, 1931; Ph.D., 1933.

Basye, Robert Eugene, Professor of Mathematics. (1940, 1952)
B.A., Missouri, 1929; M.A., Princeton, 1931; Ph.D., Texas, 1933.

Baty, James Bernard, Professor of Civil Engineering. (1948, 1950)
B.S., Agricultural and Mechanical College of Texas, 1925; M.C.E., Cornell, 1950; Reg. Prof. Engr.

Baugh, Orville Lee, Instructor of Mathematics. (1956)
B.S., North Texas State College, 1941; M.S., 1951.

Bayliss, Garland Erastus, Assistant Professor of History. (1956, 1958)
B.S., Arkansas, 1951; M.A., Texas, 1953.

Beachell, Henry M., Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Nebraska, 1930; M.S., Kansas State College, 1933.

Beamer, Russell James, Professor of Veterinary Medicine and Surgery. (1954, 1959)
D.V.M., Iowa State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1958.

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Beasley, Joseph Noble, Associate Professor of Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1949; M.S., 1956.

Bebout, Harley, Associate Professor of Agricultural Economics. (1939, 1959)
B.S., Missouri, 1925; M.S., Agricultural and Mechanical College of Texas, 1939.

Beckham, John Blair, Associate Professor of Chemistry. (1946, 1958)
A.B., Daniel Baker College, 1936; B.S., 1937; M.S., Agricultural and Mechanical College of Texas, 1950.

Bell, Rurel Roger, Associate Professor of Veterinary Parasitology. (1952, 1958)
D.V.M., Georgia, 1952; M.S., Agricultural and Mechanical College of Texas, 1955.

Bennett, Alvin Lowell, Associate Professor of English. (1954, 1957)
B.A., Texas, 1927; M.A., Washington, 1931; Ph.D., Texas, 1952.

Bennett, Joseph D., Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Mississippi State College, 1949.

Bennett, Joseph Marion, Captain, Assistant Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951.

Benson, Fred Jacob, Dean of the School of Engineering, Executive Officer of the Texas Transportation Institute, and Professor of Civil Engineering. (1937, 1957)
B.S., Kansas State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1936; Reg. Prof. Engr.

Benton, Wilbourn Eugene, Associate Professor of Government. (1957)
B.A., Texas Technological College, 1939; M.A., 1941; Ph.D., Texas, 1948.

Bernard, Cicero Henry, Associate Professor of Physics. (1941, 1947)
A.B., Phillips, 1928; M.S., Kentucky, 1931.

Berry, Raymond Orvil, Professor of Animal Husbandry. (1931, 1950)
B.S., North Texas State Teachers College, 1928; M.S., Agricultural and Mechanical College of Texas, 1932; Ph.D., Johns Hopkins, 1939.

Berry, William Thomas, Jr., Assistant Professor of Animal Husbandry. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1955.

Bertrand, Clint Albert, Assistant Professor of Industrial Education. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1953.

Biggs, Odie Elmer, Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Oklahoma Agricultural and Mechanical College, 1951.

Bird, Luther Smith, Associate Professor of Plant Physiology and Pathology. (1951, 1959)
B.S., Clemson College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1955.

Bitner, Claude Andrell, Jr., Assistant Professor of Economics. (1959)
B.B.A., Texas, 1950; M.A., 1956.

Blackhurst, Homer T., Professor of Horticulture. (1947, 1950)
A.B., Glenville State Teachers College, 1935; M.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., 1947.

Blank, Horace R., Professor of Geology. (1949, 1953)
B.S., Pennsylvania, 1919; Ph.D., 1924.

Bloodworth, Morris Elkins, Associate Professor of Agronomy. (1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1953; Ph.D., 1958.

Bonnen, Clarence Alfred, Professor of Agricultural Economics. (1937, 1948)
B.S., Illinois, 1920; M.S., 1924.

Boone, James Leroy, Jr., Assistant Professor of Industrial Education. (1952, 1955)
B.S., Agricultural and Mechanical College of Texas, 1947; M.Ed., 1948.

Boriskie, Ben Bernard, Associate Professor of Physics. (1941, 1959)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1948.

Bossler, Robert Burns, Professor of Petroleum Engineering. (1956)
B.S., Pittsburgh, 1918.

Boughton, Ivan Bertrand, Professor of Veterinary Pathology. (1948, 1953)
D.V.M., Ohio State, 1916.

Brady, Thomas Trevel, Jr., Instructor of Floriculture and Landscape Architecture. (1958)
B.S., Agricultural and Mechanical College of Texas, 1954.

Branson, Robert Earl, Professor of Agricultural Economics and Sociology. (1955, 1958)
B.S., Southern Methodist, 1941; M.P.A., Harvard, 1948; M.A., 1949; Ph.D., 1954.

Brazzel, James Roland, Associate Professor of Entomology. (1957)
B.S., Louisiana State, 1951; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Breitenkamp, Edward Carlton, Associate Professor of Modern Languages. (1953, 1956)
B.A., Drake, 1936; M.A., 1938; Ph.D., Iowa, 1951.

Brewer, Burns W., Professor of Mathematics. (1938, 1957)
A.B., Missouri, 1935; A.M., 1936; Ph.D., 1938.

Bridges, Charles Hubert, Professor of Veterinary Pathology. (1955, 1959)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1954; Ph.D., 1957.

Briggs, E. J., Captain, Assistant Professor of Air Science. (1957)
B.S., Arkansas, 1942.

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)
B.S., Agricultural and Mechanical College of Texas, 1921; M.S., Michigan State College, 1931.

Brown, Claude L., Lecturer, Department of Genetics. (1957)
B.S.F., Georgia, 1948; M.S., 1954; Ph.D., Harvard, 1957.

Brown, LeRoy C., Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1959)
B.A., Arizona State College, 1940.

Brown, Murray Allison, Assistant Professor of Dairy Science. (1955, 1957)
B.S., Michigan State College, 1950; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Brown, Meta Suche, Professor of Agronomy. (1940, 1955)
B.A., Texas, 1931; M.A., 1933; Ph.D., 1935.

Brown, Stewart Ellsworth, Instructor of Mechanical Engineering. (1951)

Brown, Sidney Overton, Professor of Biology and Research Physiologist. (1936, 1959)
B.A., Texas, 1932; Ph.D., 1936.

Brundidge, Kenneth Cloud, Assistant Professor of Meteorology. (1955, 1958)
B.A., Chicago, 1952; M.S., 1953.

Buchanan, Spencer Jennings, Professor of Civil Engineering. (1946)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., Massachusetts Institute of Technology, 1931; C.E., Agricultural and Mechanical College of Texas, 1948; Reg. Prof. Engr.

Budwine, Robert Edward, Instructor of Physics. (1959)
B.S., Lamar State College of Technology, 1954; M.S., North Texas State College, 1957.

Burchard, Donald Dix, Professor of Journalism and Head of Department. (1948)
A.B., Beloit College, 1925; A.M., Missouri, 1938.

Burgess, Archie Rostron, Professor of Industrial Engineering and Head of Department. (1948, 1951)
B.S., Washington, 1932; M.S., 1938; Reg. Prof. Engr.

Burke, Horace Reagan, Assistant Professor of Entomology. (1958)
B.S., Sam Houston State Teachers College, 1953; M.S., Agricultural and Mechanical College of Texas, 1955.

Burns, Edward Eugene, Associate Professor of Horticulture. (1956, 1959)
B.S., Purdue, 1950; M.S., 1952; Ph.D., 1956.

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology and Head of Department. (1926, 1935)
B.S., Agricultural and Mechanical College of Texas, 1923; D.V.M., 1926.

Burroughs, Albert Lawrence, Serologist of Department of Veterinary Microbiology. (1954, 1957)
B.S., Wyoming, 1938; M.S., Montana State College, 1941; Ph.D., California, 1946.

Butler, Marvin Harold, Assistant Professor of Economics. (1948)
A.B., McKendree College, 1940; M.A., Illinois, 1948.

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry and Head of Department. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947; Ph.D., Michigan State College, 1953.

Byrns, Robert Eugene, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1958)
B.A., Colorado State College of Education, 1933.

Caddess, James Harvey, Associate Professor of Mechanical Engineering. (1940, 1953)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1934; Reg. Prof. Engr.

Cain, Roy Edward, Instructor of English. (1956)
B.A., North Texas State College, 1953; M.A., 1954.
(On leave of absence.)

Calaway, Paul Kenneth, Professor of Chemistry and Head of Department. (1957)
B.A., Arkansas College, 1931; M.S., Georgia Institute of Technology, 1933; Ph.D., Texas, 1938.

Caldwell, Augustus George, Associate Professor of Agronomy. (1954, 1955)
B.S.A., Toronto, 1946; M.A.A., 1948; Ph.D., Iowa State College, 1955.

Calhoun, John C., Jr., Vice Chancellor for Engineering and Professor of Petroleum Engineering. (1955, 1959)
B.S., Pennsylvania State College, 1937; M.S., 1941; Ph.D., 1946; Reg. Prof. Engr.

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery and Head of Department. (1958)
B.S., Agricultural and Mechanical College of Texas, 1941; D.V.M., 1949.

Calvert, Wesley Donald, Assistant Professor of Journalism. (1954, 1957)
A.B., Missouri, 1951; B.J., 1951.

Camp, Bennie Joe, Assistant Professor of Biochemistry and Nutrition. (1956)
B.S., East Texas State Teachers College, 1949; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Cantrell, Wallace Gene, Instructor of Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Cartwright, Thomas Campbell, Professor of Animal Husbandry and of Genetics. (1958)
B.S., Clemson Agricultural College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1954.

Chalk, Alfred Franklin, Professor of Economics and Head of Department. (1936, 1956)
B.A., Baylor, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1950.

Chandler, David Jarrett, Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., United States Military Academy, 1949.

Chumlea, Wesley Sission, Assistant Professor of Government. (1956, 1959)
B.A., Texas, 1949; M.A., 1951; Ph.D., 1959.

Clark, William Jesse, Assistant Professor of Biology. (1957)
B.S., Utah State Agricultural College, 1950; M.S., 1956; Ph.D., 1958.

Clayton, William Howard, Assistant Professor of Oceanography and Research Scientist. (1954, 1958)
B.S., Bucknell, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Cleland, Samuel Miles, Professor of Engineering Drawing. (1941, 1958)
B.A., West Texas State Teachers College, 1931; M.Ed., Agricultural and Mechanical College of Texas, 1940.

Cochran, Robert Glenn, Professor of Nuclear Engineering and Head of Department. (1959)
A.B., Indiana, 1948; M.S., 1950; Ph.D., Pennsylvania State, 1957.

Cochrane, John Douglas, Assistant Professor of Oceanography and Research Scientist. (1959)
B.S., California, 1943; M.S., Scripps Institute of Oceanography, 1948.

Coffey, Lee Clayton, Professor of Agronomy. (1950, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1950; Ph.D., Iowa State, 1954.

Coffin, Grange Simons, Jr., Captain, Assistant Professor of Air Science. (1957)
B.S., The Citadel, 1951.

Comfort, Thomas Edwin, Associate Professor of Modern Languages. (1954, 1957)
A.B., Northwestern, 1943; A.M., Illinois, 1951; Ph.D., 1954.
(On leave of absence.)

Cook, Benjamin Davey, Assistant Professor of Agricultural Education and Specialist in Extension Training. (1950, 1957)
B.S., Agricultural and Mechanical College of Texas, 1934; M.Ed., 1950; Ph.D., Wisconsin, 1957.

Cook, Elton D., Agronomist of Texas Agricultural Experiment Substation, Temple. (1949, 1952)
B.S., Texas Technological College, 1935; M.S., Kansas State, 1948; Ph.D., Nebraska, 1951.

Coon, Jesse Bryan, Professor of Physics. (1946, 1957)
A.B., Indiana, 1932; M.A., 1935; Ph.D., Chicago, 1949.

Cooley, Bernard Matt, Instructor of Veterinary Medicine and Surgery. (1960)
D.V.M., Agricultural and Mechanical College of Texas, 1948.

Couch, James Russell, Professor of Biochemistry and Nutrition and of Poultry Science. (1948, 1949)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; Ph.D., Wisconsin, 1948.

CoVan, Jack Phillip, Professor of Industrial Engineering. (1946, 1956)
B.M.E., Ohio State, 1935; B.I.E., 1935; M.S., Illinois, 1942; Reg. Prof. Engr.

Cover, Sylvia A., Professor, Home Economics Department, Texas Agricultural Experiment Station. (1933, 1949)
B.S., Illinois, 1920; M.A., Missouri, 1929; Ph.D., 1933.

Cox, Sidney Saunders, Assistant Professor of English. (1948, 1952)
B.A., Southwest Texas State Teachers College, 1932; M.A., 1939.

Craig, Robert Neal, Associate Professor of Agricultural Education. (1940, 1958)
B.S., Agricultural and Mechanical College of Texas, 1937.

Crawford, Charles William, Associate Dean of Engineering and Professor of Mechanical Engineering. (1919, 1957)
B.S., Agricultural and Mechanical College of Texas, 1919; M.S., 1929; Reg. Prof. Engr.

Crawford, Paul B., Assistant Director of Texas Petroleum Research Committee. (1952)
B.S., Texas Technological College, 1943; M.S., Texas, 1946; Ph.D., 1949.

Creswell, Horace Staley, Assistant Professor of English. (1946, 1951)
B.S., Texas Technological College, 1935; M.A., Texas Christian, 1938.

Crittenden, Elmer Pratt, Assistant Professor of English. (1956)
B.A., Boston, 1939; M.A., Southern Methodist, 1946.

Cronk, Alfred Edward, Professor of Aeronautical Engineering and Head of Department. (1956)
B.S., College of Saint Thomas, 1937; M.S., Minnesota, 1946.

Crookshank, Herman Robert, Animal Nutritionist for the Department of Biochemistry and Nutrition, USDA. (1959)
B.S., Northeast Missouri State College, 1938; M.S., 1940; Ph.D., Iowa State, 1942.

Crow, Ulrich Wilson, Counselor and Assistant Professor, Basic Division. (1958)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Ed., 1956.

Cudd, J. Van, Instructor of Architecture. (1959)
B.A., Agricultural and Mechanical College of Texas, 1959.

Dabbs, Jack Autrey, Professor of Modern Languages. (1950, 1959)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1950.

Dahlberg, Frank Iver, Professor of Animal Husbandry. (1936, 1947)
B.S., Agricultural and Mechanical College of Texas, 1925; M.S., Wisconsin, 1930.

Daigle, Thomas Jerry, Instructor of Modern Languages. (1958)
B.A., Southwestern Louisiana Institute, 1950; M.S., Louisiana State, 1958.

Daniels, Marion Gordon, Assistant Professor of Economics. (1953, 1956)
A.B., Doane College, 1947; M.A., Texas, 1949.
(On leave of absence.)

Darrow, Robert Arthur, Professor and Acting Head of Department of Range and Forestry. (1948, 1959)
B.S., New York State College of Forestry, 1932; M.S., Arizona, 1935; Ph.D., Chicago, 1937.

Davey, Ralph Hemmings, Jr., Assistant Professor of Engineering Drawing. (1955, 1958)
B.S., United States Military Academy, 1932.

Davich, T. B., Entomologist, United States Department of Agriculture, Cotton Insect Program. (1956)
B.S., Ohio State, 1948; M.S., Wisconsin, 1951; Ph.D., 1953.

Davies, Ronald Edgar, Assistant Professor of Poultry Science. (1959)
B.S.A., British Columbia, 1954; M.S.A., 1956; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Davis, Daniel Rowland, Associate Professor of Rural Sociology. (1935, 1947)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1935.

Davis, Joe Eugene, Colonel, Commandant of the School of Military Sciences. (1930, 1951)
B.S., Agricultural and Mechanical College of Texas, 1930.

*Davis, John Gilmore, Assistant Professor of Biochemistry and Nutrition. (1958)
B.S., Virginia Military Institute, 1950.

Davis, Richard Bratton, Associate Professor of Wildlife Management. (1951, 1959)
B.S., Texas College of Arts and Industries, 1940; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1952.

Davis, Richard Harvey, Jr., Associate Professor of Veterinary Physiology and Pharmacology. (1951, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1956.

Davis, William B., Professor of Wildlife Management and Head of Department. (1937, 1946)
B.A., Chico State Teachers College, 1933; M.A., California, 1936; Ph.D., 1937.

Davison, Richard Read, Instructor of Chemical Engineering. (1958)
B.S., Texas Technological College, 1949; M.S., Agricultural and Mechanical College of Texas, 1958.

Decker, John Petty, Instructor of Physics. (1956)
B.S., Arkansas, 1949; M.S., Agricultural and Mechanical College of Texas, 1953; Reg. Prof. Engr.

Degenhardt, William George, Instructor of Biology. (1955)
A.B., Syracuse, 1950; M.S., Northeastern, 1953.

Dehlinger, Peter, Professor of Geophysics. (1954, 1957)
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943; Ph.D., 1950.

Denison, John Scott, Associate Professor of Electrical Engineering. (1949, 1954)
B.S., New Mexico Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Engr.

Denton, Allen Eugene, Jr., Counselor and Assistant Professor, Basic Division. 1951, 1957)
B.A., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1949.

Denton, James Henry, Assistant Professor of Veterinary Medicine and Surgery. (1958)
D.V.M., Agricultural and Mechanical College of Texas, 1945.

DeWerth, Adolphe Ferdinand, Professor of Floriculture and Landscape Architecture and Head of Department. (1946, 1949)
B.S., Ohio State, 1930; M.S., 1931.

Dillingham, Harley Clay, Professor of Electrical Engineering. (1922, 1930)
B.S., Agricultural and Mechanical College of Texas, 1922; A.M., Columbia, 1930; Reg. Prof. Engr.

Dillon, Lawrence Samuel, Associate Professor of Biology. (1948, 1955)
B.S., Pittsburgh, 1933; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1954.
(On leave of absence.)

Doak, Clifton Childress, Professor of Biology and Head of Department. (1926, 1937)
B.S., North Texas State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1928; Ph.D., Illinois, 1933.

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*Resigned effective December 6, 1959.

Dobson, William Jackson, Professor of Biology and Counselor, Basic Division. (1947, 1956)
B.A., Austin College, 1939; Ph.D., Texas, 1946.

Donaldson, Joseph, Jr., Lecturer on Architecture. (1956)

Dowell, William Merl, Professor of Health and Physical Education. (1942, 1950)
B.S., Sam Houston State Teachers College, 1929; M.A., George Peabody College, 1932.

Downard, Richard Walter, Assistant Professor of Mechanical Engineering. (1913, 1939)

Dozier, James Hall, Assistant Professor of Business Administration. (1955, 1959)
LL.B., Texas, 1950.

Druce, Albert John, Associate Professor of Electrical Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1950.

Duncan, John Thomas, Assistant Professor of History. (1943, 1951)
B.A., Simmons College, 1924; M.A., Texas Technological College, 1942.

Dunlap, Wayne Alan, Assistant Professor of Civil Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1955.

Earle, James Hubert, Instructor of Engineering Drawing. (1957)
B.Arch., Agricultural and Mechanical College of Texas, 1955.

Ebbs, John Dale, Assistant Professor of English. (1959)
A.B., North Carolina, 1948; M.A., 1949; Ph.D., 1958.

Edmondson, Vance Ward, Associate Professor of Agricultural Economics. (1956, 1959)
B.S., Arkansas, 1948; M.S., Oklahoma Agricultural and Mechanical College, 1950; Ph.D., Cornell, 1956.

Egar, Joseph Michael, Assistant Professor of Geology. (1955, 1957)
B.S., Oklahoma, 1952.
(On leave of absence.)

Eisner, Melvin, Professor of Physics. (1948, 1957)
B.A., Brooklyn College, 1942; M.S., North Carolina, 1947; Ph.D., 1948.

Ekfelt, Fred Emil, Professor of English. (1938, 1951)
B.A., Iowa, 1931; M.A., 1932; Ph.D., 1941.

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)
B.S., United States Military Academy, 1933.

Elkins, Rollin Lafayette, Associate Professor of Business Administration. (1935, 1946)
B.S., Agricultural and Mechanical College of Texas, 1933; M.S., 1935.

Ellett, Edwin Willard, Assistant Professor of Veterinary Medicine and Surgery. (1958)
D.V.M., Georgia, 1953; B.S., Virginia Polytechnic Institute, 1954.

Elmquist, Karl Erik, Associate Professor of English. (1935, 1947)
A.B., Southern Methodist, 1932; M.A., Texas, 1939.

Endrizzi, John Edwin, Assistant Professor of Agronomy and of Genetics. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., Maryland, 1955

Ergle, David R., Senior Plant Physiologist of Plant Physiology and Pathology Department (Agricultural Research Service, USDA, cooperating). (1944)
B.S., Clemson College, 1926; M.S., North Carolina, 1928; Ph.D., 1930.

Esten, Clarence Kenyon, Assistant Professor of English. (1946, 1951)
A.B., Baylor, 1931; M.A., 1949.

Estes, Dwain McKinley, Assistant Professor of Education. (1959)
B.A., Baylor, 1948; M.Ed., Texas, 1950; Ed.D., 1958.

Fairbanks, Hardy Ewald, Instructor of Civil Engineering. (1957)
B.S., Houston, 1956.

Fanguy, Roy Charles, Assistant Professor of Poultry Science. (1958)
B.S., Mississippi State College, 1951; M.S., Alabama Polytechnic Institute, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Fear, Frank Augustus, Instructor of Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1959.

Feragen, Robert White, Assistant Professor of English. (1952, 1960)
B.A., Iowa State, 1950; M.A., 1952.

Ferguson, James Wilfred, Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Salem College, 1949.

Ferguson, Marvin Harry, Southwestern Director and National Research Coordinator of U. S. Golf Association, Green section (Department of Agronomy cooperating). (1952, 1953)
B.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., Maryland, 1950.

Ferguson, Thomas Morgan, Associate Professor of Poultry Science. (1946, 1956)
B.A., Southwestern, 1936; M.S., Agricultural and Mechanical College of Texas, 1946; Ph.D., 1954.

Finn, James Crampton, Jr., Assistant Professor of Horticulture. (1958)
B.S., Michigan State, 1952; M.S., 1953; Ph.D., California, 1958.

Fitch, David Robnett, Professor of Business Administration. (1949, 1957)
B.A., Agricultural and Mechanical College of Texas, 1942; M.S., Wisconsin, 1948; Ph.D., Oklahoma, 1956.

Fleming, David Winston, Associate Professor of Mechanical Engineering. (1927, 1945)
B.S., Agricultural and Mechanical College of Texas, 1930; M.Ed., 1942.

Fletcher, Robert Holton, Associate Professor of Mechanical Engineering. (1947, 1958)
B.S., Pennsylvania State College, 1928; Reg. Prof. Engr.

Flowers, Archie Ingram, Associate Professor of Veterinary Microbiology. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1942; D.V.M., 1950; M.S., 1959.

Fluker, Billie Joe, Associate Professor of Mechanical Engineering. (1951, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1953.

Franceschini, Guy Arthur, Assistant Professor of Oceanography and Meteorology. (1952, 1957)
B.S., Massachusetts, 1950; M.S., Chicago, 1952.

Franklin, Benjamin David, Instructor of Civil Engineering. (1958)
B.S., North Carolina State College, 1948; B.S., Agricultural and Mechanical College of Texas, 1958.

Frazier, Charles Edward, Jr., Assistant Professor of History. (1956, 1959)
B.A., Tennessee, 1949; M.A., New York, 1950; Ph.D., Texas, 1958.

Fridel, George Edward, Instructor of Electrical Engineering. (1957)
B.S., Houston, 1957.

Fudge, Joseph Franklin, Professor of Agronomy and State Chemist. (1929, 1949)
B.S., Illinois, 1924; M.S., Wisconsin, 1925; Ph.D., 1928.

Futrell, Maurice Chilton, Assistant Professor of Plant Physiology and Pathology and Plant Pathologist (Agricultural Research Service, USDA, cooperating). (1958, 1959)
B.S., Western Kentucky State College, 1947; M.S., Wisconsin, 1949; Ph.D., 1952.

Gaddis, Alvis Mathew, Associate Professor of Mechanical Engineering. (1942, 1958)
A.B., Austin College, 1930.

Gail, Albert, Professor of Aeronautical Engineering. (1959)
Diplom Ingenieur, Munich Institute of Technology, 1932.

Gaines, J. C., Professor of Entomology and Head of Department. (1947, 1952)
B.S., Alabama Polytechnic Institute, 1925; M.S., 1926, Ph.D., Iowa State College, 1937.

Gallaway, Bob Mitchel, Professor of Civil Engineering. (1944, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1946; M.Eng., 1956; Reg. Prof. Engr.

Galvin, Thomas Joseph, Instructor of Veterinary Parasitology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1957.

Gardner, Frederick Albert, Assistant Professor of Poultry Science. (1959)
B.S., Vermont, 1953; M.S., Agricultural and Mechanical College of Texas, 1955.

German, John Paul, Professor of Electrical Engineering. (1958)
B.S., Texas, 1940; M.S., 1949; Ph.D., 1955.

Getzin, Louis W., Associate Professor of Entomology. (1958)
B.S., Wisconsin, 1955; M.S., 1957; Ph.D., 1958.

Gibbons, Eldred Harris, Associate Professor of Microbiology. (1925, 1939)
B.S.A., Tennessee, 1925; S.M., Chicago, 1929.

Gibbs, Leon Wilford, Associate Professor of Veterinary Anatomy. (1949, 1958)
B.S., Agricultural and Mechanical College of Texas, 1939; D.V.M., 1949; M.S., 1957.

Gibbs, Robert H., Associate Professor of Mechanical Engineering. (1956)
B.S., United States Naval Academy, 1925.

Gibson, Roy Howard, Instructor of Mechanical Engineering. (1933, 1947)

Gladden, James Kelly, Professor of Chemistry. (1959)
B.S., Howard College, 1942; M.S., Georgia Institute of Technology, 1944; Ph.D., Northwestern, 1952.

Godbey, Chauncey Barger, Professor of Genetics and Head of Department. (1926, 1946)
B.S., Kentucky, 1925; M.S., Agricultural and Mechanical College of Texas, 1926.

Godfrey, Curtis L., Associate Professor of Agronomy. (1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1948; Ph.D., Iowa State College, 1951.

Godwin, Charles Jackson, Assistant Professor of Architecture. (1955)
B.S., Agricultural and Mechanical College of Texas, 1947; Reg. Prof. Arch.; Reg. Prof. Engr.

Goode, Phillip Barron, Professor of Business Administration. (1946, 1949)
B.S., Southern Methodist, 1933; LL.B., 1936; LL.M., Texas, 1953.

Goode, Sterling Doug, Captain, Assistant Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1953.

Gott, George Edwin, Instructor of English. (1957)
B.A., Southeast Missouri State College, 1949; M.A., Texas, 1952.

Gould, Frank Walton, Associate Professor of Range and Forestry and Curator of College Museum. (1949)
B.S., Northern Illinois State College, 1935; M.S., Wisconsin, 1937; Ph.D., California, 1941.

Gowing, Gene Martin, Instructor of Veterinary Medicine and Surgery. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; D.V.M., 1959.

Grant, Samuel J., Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Clemson Agricultural and Mechanical College, 1952.

Gravett, Howard L., Professor of Biology. (1946, 1954)
A.B., James Millikin, 1933; M.A., Illinois, 1934; Ph.D., 1939.

Gray, Jarrell D., Associate Professor of Agricultural Education. (1955, 1959)
B.S., Arkansas, 1947; M.S., 1950; D.Ed., 1955.

Greer, Clayton Alvis, Associate Professor of English. (1938, 1949)
B.A., Texas, 1921; M.A., 1927; Ph.D., 1937.

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)
B. S., Agricultural and Mechanical College of Texas, 1938; M.B.A., Stanford, 1948.

Groneman, Chris Harold, Professor of Industrial Education and Head of Department; Coordinator of Teacher Education. (1940, 1956)
B.S., Kansas State Teachers College, 1931; M.S., 1935; D.Ed., Pennsylvania State College, 1950.

Grumbles, Leland Creed, Professor of Veterinary Microbiology and Head of Department. (1949, 1957)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1957.

Guthrie, William Spurgeon, Associate Professor of Mechanical Engineering. (1942, 1950)
B.S., Central State Teachers College, 1930; M.A., Oklahoma, 1935; Reg. Prof. Engr.

Hacskaylo, Joseph, Plant Physiologist of Plant Physiology and Pathology Department (Agricultural Research Service, USDA, cooperating). (1958, 1960)
A.B., West Virginia, 1949; M.S., 1950; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Hale, Fred, Professor of Animal Husbandry in Charge of Swine Investigations. (1922, 1927)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1925.

Haley, William Robert, Jr., Major, Associate Professor of Military Science and Tactics. (1957)
B.B.A., Manhattan College, 1941.

Hall, Charles Franklin, Associate Professor of Veterinary Microbiology. (1959)
B.S., Kansas State College, 1949; D.V.M., 1951; M.S., Michigan State, 1959.

Hall, Claude Hampton, Associate Professor of History. (1951, 1959)
B.A., Virginia, 1947; M.A., 1949; Ph.D., 1954.

Hall, Dan, Associate Professor of Mathematics. (1928, 1944)
A.B., North Carolina, 1927; A.M., 1928.

Hall, Frederick Charles, Associate Professor of Aeronautical Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., California Institute of Technology, 1957.

Hall, John William, Visiting Lecturer in Architecture. (1957)
B.S., Agricultural and Mechanical College of Texas, 1941.

Hall, Wayne C., Professor of Plant Physiology and Pathology and Head of Department. (1949, 1958)
B.S., Iowa, 1941; M.S., 1946; Ph.D., 1948.

Hallmark, Glen Duncan, Professor of Electrical Engineering and Head of Department. (1942, 1958)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1946; Ph.D., 1953.

Ham, Joe Strother, Associate Professor of Physics. (1956, 1958)
Ph.B., Chicago, 1948; M.S., 1951; Ph.D., 1954.

Hamilton, Thomas Rowan, Professor of Business Administration. (1929, 1937)
A.B., Washington and Lee, 1917; M.S., Columbia, 1924; Ph.D., 1938.

Hamner, Bennett Barron, Professor of Aeronautical Engineering. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1953; Reg. Prof. Engr.

Hampton, Herbert Elwood, Professor of Agronomy. (1938, 1948)
B.S., Agricultural and Mechanical College of Texas, 1937; Ph.D., Missouri, 1943.

Hanau-Schaumburg, Maria K., Instructor of Modern Languages. (1959)
Pazmany Peter, Royal University of Hungary, 1944; Leopold Frances, University of Innsbruch, Austria, Absolutorium, 1949; M.A., Texas, 1953.

Hancock, Charles Kinney, Professor of Chemistry. (1946, 1949)
B.S., Southwest Texas State Teachers College, 1931; M.A., Texas, 1936; Ph.D., 1939.

Hanna, Ralph Lynn, Associate Professor of Entomology. (1949, 1956)
B.A., Stephen F. Austin State Teachers College, 1939; Ph.D., Agricultural and Mechanical College of Texas, 1951.

Hardaway, Bernice Aubrey, Associate Professor of Engineering Drawing. (1946, 1957)
B.S., East Texas State Teachers College, 1933; M.Ed. Agricultural and Mechanical College of Texas, 1948.

Hardemann, Lyman Bryce, Associate Professor of Industrial Education. (1947, 1957)
B.S., Kansas State Teachers College, 1939; M.Ed., Agricultural and Mechanical College of Texas, 1949.

Harmon, Gerald Stearns, Instructor of Phyiscs. (1957)
B.A., Maine, 1953; M.S., 1956.

Harrington, Edwin Lincoln, Professor of Civil Engineering. (1939, 1957)
B.S., Wyoming, 1927; C.E., 1937; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1952; Reg. Prof. Engr.

Harrington, Marion Thomas, Chancellor. (1924, 1953-57, 1959)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1927; Ph.D., Iowa State College, 1941.

Harris, James Elliott, Instructor of Mathematics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1959.

Harris, Robert Leigh, Assistant Professor of History. (1951, 1955)
A.B., Alabama, 1945; M.A., 1946; Ph.D., Duke, 1956.

Harris, William Birch, Associate Professor of Chemical Engineering. (1956)
B.S., Colorado, 1941.

Harris, William Donald, Professor of Chemical Engineering. (1935, 1949)
B.S., Iowa State College, 1929; M.S., 1931; Ph.D., 1934; Reg. Prof Engr.

Harrison, Arthur L., Plant Pathologist of Texas Agricultural Experiment Station, Yoakum. (1937, 1947)
B.S., Ontario Agricultural College, 1929; Ph.D., Cornell, 1935.

Harrison, Luther Asbery, Jr., Assistant Professor of Health and Physical Education. (1941, 1949)
B.S., Agricultural and Mechanical College of Texas, 1940.

Hartnell, George William, Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., United States Military Academy, 1948.

Hauer, Louis Frederick, Assistant Professor of English. (1937, 1944)
B.A., Dubuque, 1931; M.A., Iowa, 1933.

Haupt, Lewis McDowell, Jr., Professor of Electrical Engineering. (1930, 1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1935; Reg. Prof. Engr.

Hawkins, Leslie Virgle, Professor of Industrial Education. (1954, 1959)
B.S., Panhandle Agricultural and Mechanical College, 1938; M.S., Oklahoma Agricultural and Mechanical College, 1946; D.Ed., Pennsylvania State, 1953.

Hays, John Q., Professor of English. (1929, 1945)
A.B., Missouri, 1929; M.A., 1932; Ph.D., California, 1942.

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1956)
B.S., Stephen F. Austin State Teachers College, 1929; M.S., Agricultural and Mechanical College of Texas, 1936.

Hebert, James Oliver, Jr., Instructor of Electrical Engineering. (1958)
B.S., Louisiana State, 1951; M.S., 1957.

Heck, Walter W., Associate Professor of Plant Physiology and Pathology. (1959)
B.S., Ohio State, 1947; M.S., Tennessee, 1950; Ph.D., Illinois, 1954.

Hedgcock, Ernest Duval, Professor of English. (1936, 1949)
B.A., Tennessee, 1917; M.A., Texas, 1936.

Henry, Walter Keith, Assistant Professor of Meteorology. (1957)
B.S., Missouri, 1941; M.S., Chicago, 1949.

Hensarling, Paul Reginald, Assistant Professor of Education and Psychology. (1958)
B.S., North Texas State College, 1933; M.S., 1940; Ed.D., Houston, 1957.

Hibdon, James Edward, Associate Professor of Economics. (1959)
B.A., Oklahoma, 1948; M.A., 1949; Ph.D., North Carolina, 1957.

Hierth, Harrison Ewing, Associate Professor of English. (1946, 1957)
A.B., Illinois Wesleyan, 1935; B.Ed., Illinois State Normal, 1936; M.A., Illinois, 1942; Ph.D., Wisconsin, 1956.

Higgins, Edwin Harrison, Captain, Assistant Professor of Air Science. (1957)
B.S., Northwestern State College (Louisiana), 1947.

Hildebrand, Peter Edward, Assistant Professor of Agricultural Economics. (1959)
B.S., Colorado State, 1955; M.S., 1956; Ph.D., Michigan State, 1959.

Hildreth, Roland James, Assistant Director, Texas Agricultural Experiment Station. (1954, 1959)
B.S., Iowa State College, 1949; M.S., 1950; Ph.D., 1954.

Hill, John Hugh, Professor of History. (1934, 1954)
A.B., Austin College, 1925; M.A., 1926; M.A., California, 1939; Ph.D., Texas, 1946.
(On leave of absence.)

Hillman, John Rolfe, Assistant Professor of Mathematics. (1938, 1946)
B.S., Millsaps College, 1923; M.A., Missouri, 1929.

Hirsch, Teddy James, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.Eng., 1953.

Hobgood, Price, Professor of Agricultural Engineering and Head of Department. (1939, 1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1940; Reg. Prof. Engr.

Hoffman, Anthony Edward, Instructor of Physics. (1959)
B.S., Buena Vista College, 1957; M.S., Missouri School of Mines, 1958.

Hohn, Charles Moran, Assistant Professor of Agricultural Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Holcomb, Robert Marion, Professor of Civil Engineering. (1947)
B.S., Arizona, 1936; M.S., Iowa State College, 1941; Ph.D., 1956; Reg. Prof. Engr.

Holdredge, Edwin Sereno, Professor of Mechanical Engineering. (1939, 1957)
B.S., Tennessee, 1938; M.S., 1939; Reg. Prof. Engr.

Holland, Charles Donald, Professor of Chemical Engineering. (1952, 1959)
B.S., North Carolina State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1953.

Holleman, Theo Rufus, Professor of Architecture and Head of Division. (1946, 1958)
B.Arch., Agricultural and Mechanical College of Texas, 1940; M.Arch., 1951; Reg. Prof. Arch.

Holt, Ethan Cleddy, Professor of Agronomy. (1948, 1957)
B.S., Alabama Polytechnic Institute, 1943; M.S., Purdue, 1948; Ph.D., 1950.

Holt, Oris Milton, Associate Professor of Agricultural Education. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946.

Hood, Donald Wilbur, Associate Professor of Oceanography. (1946, 1954)
B.S., Pennsylvania State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1950.

Hopkins, Sewell Hepburn, Professor of Biology. (1935, 1947)
B.S., William and Mary College, 1927; M.A., Illinois, 1930; Ph.D., 1933.

*Hopwood, Ann Elizabeth, Instructor of English. (1959)
B.S., Alabama Polytechnic Institute, 1953; M.A., 1955.

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*Resigned effective January 30, 1960.

**Horsley**, Wendell Graham, Instructor of Architecture. (1959)
B.S.A., Denver, 1950.

**Houze**, Robert Alvin, Library Director. (1949, 1957)
A.B., Denver, 1940; B.L.S., 1941.

**Hovorak**, Louis Martin, Instructor of Mathematics. (1946)
B.S., Agricultural and Mechanical College of Texas, 1943; M.Ed., 1952.

**Howard**, John Richard, Instructor of Geography. (1956)
B.A., Washington, 1947; M.A., 1951.

**Hoyle**, Samuel Cooke, Jr., Professor of Business Administration. (1947, 1957)
LL.B., Texas, 1926; B.A., 1946; M.A., 1948.

**Hubert**, Frank William R., Dean of the School of Arts and Sciences. (1959)
B.A., Texas, 1938; M.A., 1945; Ph.D., 1950.

**Hudson**, Truett, Captain, Assistant Professor of Air Science. (1957)
B.A., Houston, 1948.

**Huggett**, Milton Alfred, Assistant Professor of English. (1946, 1951)
B.A., Rochester, 1929; B.D., Episcopal Theological School, 1933; M.A., Baylor, 1952.

**Huggins**, Frank Norris, Assistant Professor of Mathematics. (1954, 1957)
B.A., Howard Payne College, 1948; M.S., North Texas State College, 1950.
(On leave of absence.)

**Hughes**, Martin Collins, Professor of Electrical Engineering. (1923, 1932)
B.S., Illinois, 1917; E.E., 1926; Reg. Prof. Engr.
(On leave of absence.)

**Humphrey**, Charles Robert, Instructor of English. (1957)
B.A., Baylor, 1951; M.A., 1954.

**Hunt**, Robert Lee, Professor of Agricultural Economics. (1927, 1935)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., North Carolina State College, 1927; Ph.D., Wisconsin, 1934.

**Hunter**, Parks Caldwell, Jr., Assistant Professor of English. (1955, 1958)
B.A., Miami, 1948; B.Ed., 1949; M.A., 1950; Ph.D., Texas, 1958.

**Hurt**, John Tom, Professor of Mathematics. (1936, 1947)
B.A., Rice Institute, 1931; M.A., 1932; Ph.D., 1935.

**Huss**, Donald Lee, Assistant Professor of Range and Forestry. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1954; Ph.D., 1959.

**Hutchison**, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1949; M.Ed., 1950.

**Hutton**, Dale Jovon, Instructor of Architecture. (1960)
B.Arch., Agricultural and Mechanical College of Texas, 1960.

**Inglis**, Jack Morton, Instructor of Wildlife Management. (1958)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1952.

**Ingram**, James Drew, Instructor of Business Administration. (1957)
B.B.A., Agricultural and Mechanical College of Texas, 1956.

**Irving**, John H., Jr., Major, Associate Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1943.

**Isbell**, Arthur Furman, Associate Professor of Chemistry. (1953, 1956)
B.A., Baylor, 1937; M.S., Texas, 1941; Ph.D., 1943.

Jache, Albert William, Associate Professor of Chemistry. (1955, 1958)
B.S., New Hampshire, 1948; M.S., 1950; Ph.D., Washington, 1952.

Jackson, John Raleigh, Associate Professor of Agricultural Education. (1952, 1957)
B.S., Agricultural and Mechanical College of Texas, 1938; M.Ed., 1948; Ed.D., Houston, 1959.

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health and Head of Department. (1937, 1957)
B.S., Agricultural and Mechanical College of Texas, 1924; D.V.M., 1926.

Jernigan, Jesse Stewart, Assistant Professor of English. (1952, 1954)
B.A., North Texas State College, 1933; M.A., Southern Methodist, 1946; M.A., California, 1950.

Jimenez, Rudolph August, Assistant Professor of Civil Engineering. (1959)
B.S., Arizona, 1948; M.S., 1951.

Joham, Howard Ernest, Professor of Plant Physiology and Pathology. (1946, 1959)
B.A., Santa Barbara College, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., Iowa State College, 1950.

Johnson, Samuel Park, Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., East Texas State Teachers College, 1950; M.S., Agricultural and Mechanical College of Texas, 1952; Ph.D., 1954.
(On leave of absence.)

Jones, Charles Edward, Instructor of Physics. (1957)
B.S., Arkansas, 1952; M.S., 1956.

Jones, Truman Ross, Jr., Associate Professor of Civil Engineering. (1947, 1957)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1955.

Jungerman, Paul Frank, Assistant Professor of Veterinary Microbiology. (1956)
D.V.M., Agricultural and Mechanical College of Texas, 1947; M.S., 1959.

Kadow, William Bruce, Assistant Professor of English. (1954, 1959)
A.B., Arkansas, 1951; M.A., 1952.

Kahan, Archie Marion, Executive Director of Texas Agricultural and Mechanical Research Foundation. (1953, 1954)
B.A., Denver, 1936; M.A., 1940; M.S., California Institute of Technology, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Kasten, Frederick H., Assistant Professor of Biology. (1956, 1957)
B.A., Houston, 1950; M.A., Texas, 1951; Ph.D., 1954.

Kavanaugh, Milam Shelby, Associate Professor of Psychology. (1947, 1951)
B.A., Texas, 1934; M.A., 1934.

Keel, Loyd Bush, Assistant Professor of English. (1942, 1947)
B.A., Texas, 1927; M.A., 1933.

Keese, Charles Joseph, Professor of Civil Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Kemler, Arden Grant, Associate Professor of Veterinary Anatomy. (1959)
D.V.M., Kansas State College, 1950; M.S., Georgia, 1959.

Kenagy, Herbert Glenn, Associate Professor of Business Administration. (1955, 1957)
Ph.B., Central Missouri Teachers College, 1912; A.B., Missouri, 1916; B.S., 1916; M.A., Minnesota, 1917.

Kennedy, Harvey Thomas, Distinguished Professor of Petroleum Engineering. (1949)
B.S., Cornell, 1921; Ph.D., Johns Hopkins, 1928; Reg. Prof. Engr.

Kent, Jack Thurston, Associate Professor of Mathematics. (1936, 1952)
A.B., Lambuth College, 1930; M.A., Arkansas, 1931.

Kerley, Sidney Auston, Associate Professor of Education and Director of Group Work and Counseling, Basic Division. (1952, 1957)
B.A., Agricultural and Mechanical College of Texas, 1939; M.Ed., North Texas State College, 1950.

Kidd, Harry Lee, Jr., Associate Professor of English. (1939, 1950)
B.A., Texas, 1935; M.A., 1938.

Killebrew, James Bryan, Captain, Assistant Professor of Air Science. (1958)
B.S., Houston, 1951.

Kincannon, John Alvin, Assistant Professor of Agricultural Economics. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1949; Ph.D., 1952.

Kindall, Sheldon Milam, Instructor of Mathematics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., Louisiana State, 1956.

King, Donald Roy, Associate Professor of Entomology. (1953, 1958)
B.S., Baldwin-Wallace College, 1949; M.S., Ohio State, 1951; Ph.D., 1952.

King, General Tye, Assistant Professor of Animal Husbandry. (1953, 1956)
B.S., Kentucky, 1950; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Kinman, Murray Luther, Agronomist of Department of Agronomy (Agricultural Research Service, USDA, cooperating). (1950)
B.S., Kansas State College, 1942; M.S., Iowa State College, 1944; Ph.D., 1950.

Kirkpatrick, Thomas Owen, Instructor of Business Administration. (1958)
B.B.A., North Texas State College, 1957; M.B.A., 1958.
(On leave of absence.)

Klatt, Fred, Jr., Instructor of Floriculture and Landscape Architecture. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952.

Klipple, Edmund Chester, Professor of Mathematics and Head of Department. (1935, 1952)
B.A., Texas, 1926; Ph.D., 1932.

Knapp, Robert Andrew, Instructor of Mathematics. (1957)
B.S., United States Naval Academy, 1922; M.Ed., Agricultural and Mechanical College of Texas, 1954.

Knebel, Earl H., Associate Professor of Agricultural Education. (1955, 1959)
B.S., Montana State College, 1946; M.Ed., Agricultural and Mechanical College of Texas, 1951; D.Ed., Oklahoma Agricultural and Mechanical College, 1955.

Koenig, Karl Joseph, Associate Professor of Geology. (1955, 1957)
B.S., Illinois, 1941; M.S., 1946; Ph.D., 1949.

Konecny, Frank Jack, Executive Assistant, Engineering Extension Service. (1955)
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Kranz, Edward Douglas, Instructor of Mechanical Engineering. (1952)

Krise, George Martin, Associate Professor of Biology. (1959)
B.A., Texas, 1946; M.A., 1948; Ph.D., 1952.

Kroitor, Harry Peter, Assistant Professor of English. (1958)
B.A., Saskatchewan, 1946; M.A., 1950; Ph.D., Maryland, 1957.

Krueger, Willie F., Professor of Poultry Science. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1949; Ph.D., Missouri, 1952.

Kunkel, Harriott Orren, Professor of Animal Husbandry and of Biochemistry and Nutrition. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1948; Ph.D., Cornell, 1950.

Kunze, George William, Associate Professor of Agronomy. (1952, 1956)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1950; Ph.D., Pennsylvania State College, 1952.

Kunze, Otto Robert, Associate Professor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Iowa State College, 1951.

Kutach, Wilbur Dee, Counselor and Assistant Professor, Basic Division. (1952) 1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1952.

Kyre, Martin Theodore, Jr., Instructor of History and Government. (1959)
B.A., Ohio Wesleyan, 1950; M.A., Washington, 1957.

LaMotte, Charles, Professor of Biology. (1930, 1939)
B.A., Texas, 1929; M.A., 1929; Ph.D., Illinois, 1937.

Landiss, Carl Wilson, Professor of Health and Physical Education. (1943, 1954)
B.S., Abilene Christian College, 1935; M.Ed., Agricultural and Mechanical College of Texas, 1947; D.Ed., Pensylvania State College, 1951.

Lang, Herbert Howard, Associate Professor of History. (1956, 1959)
B.A., Texas, 1949; M.A., 1950; Ph.D., 1954.

Laverty, Carroll Dee, Professor of English. (1939, 1955)
A.B., Colorado, 1933; A.M., 1934; Ph.D., Duke, 1951.

Laywell, Clifton Myron, Assistant Professor of Agricultural Education. (1960)
B.S., Southwest Texas State Teachers College, 1956.

Lee, Dean Ralph, Assistant Professor of Chemistry. (1941, 1947)
B.S., Memphis State College, 1937; M.S., Agricultural and Mechanical College of Texas, 1939.

Leighton, Rudolph Elmo, Professor of Dairy Science. (1947, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1932; M.S., 1943; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Leipper, Dale F., Professor of Oceanography and Meteorology and Head of Department. (1949, 1950)
B.S., Wittenberg College, 1937; M.A., Ohio State, 1939; Ph.D., California, 1950.

Leland, Thomas William, Professor of Business Administration and Head of Division. (1922, 1926)
B.A., Wisconsin, 1921; M.S., 1922; C.P.A., 1928.

Letbetter, Thomas Doyle, Associate Professor of Business Administration. (1948)
B.B.A., Texas, 1933; M.S., Agricultural and Mechanical College of Texas, 1947; C.P.A., 1949.

Lewis, Robert Donald, Director of Texas Agricultural Experiment Station. (1946)
B.S., Pennsylvania State College, 1919; Ph.D., Cornell, 1926.

Liebhafsky, Erwin Eugene, Associate Professor of Economics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Illinois, 1950.

Lindsay, James Donald, Professor of Chemical Engineering and Head of Department. (1938, 1944)
B.S., Michigan, 1924; M.S., 1925; Ph.D., 1934; Reg. Prof. Engr.

Little, Van Allen, Professor of Entomology. (1923, 1937)
B.A., Sam Houston State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1925; Ph.D., 1943.

Liverman, James Leslie, Professor of Biochemistry and Nutrition. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., California Institute of Technology, 1952.
(On leave of absence.)

Logan, Earl, Jr., Assistant Professor of Mechanical Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1958; Reg. Prof. Engr.
(On leave of absence.)

Lowe, Dan Copeland, Instructor of Business Administration. (1955)
B.S., Stephen F. Austin State College, 1946; M.Ed., 1951.

Lowe, Horace A., Jr., Major, Associate Professor of Military Science and Tactics. (1957)
B.S., Bucknell, 1940; M.B.A., Southern California, 1949.

Loyd, Coleman Monroe, Assistant Professor of Physics. (1953, 1957)
B.S., Nebraska State Teachers College, 1939; M.A., Wayne, 1948; M.S., Agricultural and Mechanical College of Texas, 1955.

Luther, Herbert Adesla, Professor of Mathematics. (1937, 1947)
B.A., Pittsburgh, 1934; M.S., Iowa, 1935; Ph.D., 1937.

Lyerly, Paul J., Research Coordinator, Substation No. 17, Texas Agricultural Experiment Station, Ysleta. (1942, 1958)
B.S., North Carolina State College, 1938; M.S., Iowa State College, 1940; Ph.D., 1942.

Lyle, Robert Reed, Assistant Professor of Mathematics. (1937, 1946)
B.S., Washington and Jefferson College, 1931; M.A., Buffalo, 1933.

Lyles, Henry Francis, Instructor of Business Administration. (1958)
B.B.A., North Texas State College, 1956; M.B.A., 1957.

Lyman, Carl Morris, Professor of Biochemistry and Nutrition and Head of Department. (1940, 1949)
B.S., Oregon, 1931; A.M., Oregon State College, 1933; Ph.D., Pittsburgh, 1937.

Lynch, Shirley Alfred, Professor of Geology and Head of Department of Geology and Geophysics. (1946)
B.S., Missouri, 1928; M.S., 1931; E.M., 1935; Reg. Prof. Engr.

Lyons, Charles Rogers, Director of Student Health. (1956, 1957)
A.B., Miami, 1938; M.D., Ohio State, 1941.

McAfee, Thomas Edison, Professor of Agronomy. (1939, 1957)
B.S., Oklahoma Agricultural and Mechanical College, 1939; M.S., 1940; Ph.D., Agricultural and Mechanical College of Texas, 1953.

McCasland, William Richard, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957.
(On leave of absence.)

McCorvey, David Dixon, Major, Associate Professor of Military Science and Tactics. (1958)
B.S., Georgia, 1939.

McCrady, James David, Instructor of Veterinary Physiology and Pharmacology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1952; D.V.M., 1958.

McCulley, William Straight, Associate Professor of Mathematics. (1937, 1957)
B.A., Iowa State, 1932; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1956.

McCully, Wayne Gunther, Assistant Professor of Range and Forestry. (1948)
B.S., Colorado State College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1958.

McCune, William Edward, Professor of Agricultural Engineering. (1959)
B.S., Kansas State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1944.

McDonell, James Edward, Instructor of Meteorology. (1958)
B.S., Huron College, 1953; M.S., Agricultural and Mechanical College of Texas, 1959.

*McGarrah, James Eugene, Assistant Professor of Engineering Drawing. (1955, 1958)
B.S., United States Naval Academy, 1951; M.S., Agricultural and Mechanical College of Texas, 1957.

McGee, Roger Valentine, Associate Professor of Mathematics. (1928, 1948)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1938.

McGraw, Joseph James, Assistant Professor of Architecture. (1958)
B.A., Oklahoma Agricultural and Mechanical College, 1953; M.C.P., Harvard, 1956.

McGuire, John Gilbert, Professor of Architecture and Assistant Dean of Engineering. (1935, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1937; B.S., 1944; Reg. Prof. Engr.

McMurry, Edgar Dowling, Assistant Professor of Veterinary Physiology and Pharmacology and Assistant to the Dean of Veterinary Medicine. (1955, 1958)
D.V.M., Agricultural and Mechanical College of Texas, 1951.

McNeely, John Gordon, Professor of Agricultural Economics. (1947, 1950)
B.S., South Dakota State College, 1933; M.S., 1934; Ph.D., Wisconsin, 1941.

McNiel, Norbert Arthur, Assistant Professor of Genetics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1935; M.Ed., 1952; Ph.D., 1955.

Mackin, John Gilman, Professor of Marine Biology. (1950)
B.S., East Central State College, Ada, Oklahoma, 1924; M.S., Illinois, 1927; Ph.D., 1933.

Magee, Aden Combs, Professor of Agricultural Economics. (1955, 1956)
B.S., Kansas State College, 1924; M.S., Agricultural and Mechanical College of Texas, 1926.

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*Resigned effective January 5, 1960.

Mamaliga, Emil, Associate Professor of Health and Physical Education. (1947, 1957)
B.S., Ohio State, 1943; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Manning, Walter Scott, Associate Professor of Business Administration. (1941, 1947)
B.B.A., Texas College of Arts and Industries, 1932; M.B.A., Texas, 1940; C.P.A., 1952.

Marsh, James Hyde, III, Assistant Professor of Architecture. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1957.

Martin, Lee Jackson, Associate Professor of English. (1946, 1957)
B.S., Texas, 1941; M.A., 1948; Ph.D., Stanford, 1956.

Martin, William Lee, Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Alabama Polytechnic Institute, 1950.

Mason, Paul M., Associate Professor of Engineering Drawing. (1946, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1946.

Mattern, Terrence John, Assistant Professor of English. (1953, 1957)
B.A., George Peabody College, 1947; M.A., 1947.

Medlen, Ammon Brown, Associate Professor of Biology. (1946, 1955)
B.A., Baylor, 1930; M.A., 1932; Ph.D., Agricultural and Mechanical College of Texas, 1952.

Metzer, Robert Benjamin, Instructor of Agronomy. (1958)
B.S., Agricultural and Mechanical College of Texas, 1956.

Meyers, Edward Arthur, Assistant Professor of Chemistry. (1956)
B.S., Michigan, 1950; Ph.D., Minnesota, 1955.

Middleton, Errol Bathurst, Professor of Chemistry. (1922, 1942)
B.A., Illinois, 1919; M.S., 1921; Ph.D., 1938.

Miller, Charles Edward, Assistant Professor of Biology. (1959)
B.S., Furman, 1951; M.A., North Carolina, 1954; Ph.D., 1957.

Miller, Charles Standish, Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956; Ph.D., 1959.

Miller, Horace Otis, Associate Professor of Journalism. (1947, 1948)
A.B., Texas, 1918; M.J., 1920; LL.B., 1928.

Miller, Jarvis Ernest, Assistant Professor of Agricultural Economics. (1958)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Purdue, 1951; Ph.D., 1954.

Miller, Thomas Lloyd, Associate Professor of History. (1946, 1957)
B.A., East Texas State Teachers College, 1935; M.A., 1945; Ph.D., Texas, 1956.

Milliff, John Henry, Professor of Veterinary Anatomy and Head of Department. (1936, 1941)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; D.V.M., 1936; Ph.D., Texas, 1958.

Mills, Jim Frank, Assistant Professor of Agronomy. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Mitchell, Richard Warren, Assistant Professor of Physics. (1947, 1954)
B.S., Lynchburg College, 1943; M.S., Agricultural and Mechanical College of Texas, 1953.

Moehlman, Carl B., Instructor of Mathematics. (1942)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1932.

Mohr, Hubert Charles, Associate Professor of Horticulture. (1946, 1956)
B.S., Ohio State, 1938; M.S., 1939; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Monroe, Haskell Moorman, Jr., Instructor of History and Government. (1959)
B.A., Austin College, 1952; M.A., 1954.

Moore, Albert Vernon, Professor of Dairy Science. (1937, 1944)
B.S., Purdue, 1927; M.S., 1933; Ph.D., Michigan State College, 1948.

Moore, Bill C., Associate Professor of Mathematics. (1937, 1948)
A.B., Kansas, 1929; A.M., 1931; A.M., Princeton, 1937.

Moore, Clarence Albert, Associate Professor of Agricultural Economics. (1954, 1958)
B.S., West Texas State College, 1945; M.S., Illinois, 1946.

Moore, Richard Wayne, Assistant Professor of Veterinary Microbiology. (1958)
D.V.M., Agricultural and Mechanical College of Texas, 1955; M.S., 1956.

Moore, William Michael, Instructor of Civil Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1956.

Morgan, Stewart Samuel, Professor of English and Head of Department. (1921, 1952)
B.A., Cincinnati, 1926; M.A., Ohio State, 1927; Ph.D., 1933.

Moyer, Vance Edwards, Acting Associate Professor of Meteorology. (1958)
B.S., Pennsylvania State, 1950; M.S., 1951; Ph.D., 1954.

Mullins, Benjamin Franklin Kelso, Professor of Engineering Drawing. (1921, 1954)
A.B., Emory, 1919; M.S., 1922; M.R.E., Southwestern Baptist Theological Seminary, 1927; M.S., Agricultural and Mechanical College of Texas, 1944; Reg. Prof. Engr.

Murray, Joyce Elaine, Assistant Professor of Education. (1960)
B.A., Texas Technological College, 1942; M.Ed., Sam Houston State Teachers College, 1952.

Myers, James Arthur, Athletic Director. (1958)
B.S., Tennessee, 1947.

Nance, Joseph Milton, Professor of History and Head of Department of History and Government. (1941, 1958)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1941.

Nash, James Mosely, Instructor of Mechanical Engineering. (1957)
B.S., Houston, 1957.

Naugle, Norman Wakefield, Instructor of Mathematics. (1958)
B.A., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Naylor, Harry Benjamin, Instructor of Veterinary Medicine and Surgery. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1938.
(On leave of absence.)

Neal, James Franklin, Instructor of Veterinary Medicine and Surgery. (1958)
D.V.M., Kansas State College of Agriculture and Applied Science, 1950.

Nelson, Al B., Professor of History. (1937, 1956)
B.A., Texas Christian, 1932; M.A., 1933; Ph.D., California, 1937.

Nelson, Bardin Hubert, Professor of Rural Sociology. (1950, 1956)
B.S., Louisiana State, 1942; M.A., 1943; Ph.D., 1950.

Noel, James Sheridan, Instructor of Civil Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1958.
(On leave of absence.)

Noyes, Theodore Alvan, Assistant Professor of Mechanical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1957.

O'Bannon, Lester Severance, Professor of Mechanical Engineering. (1948)
B.M.E., Kentucky, 1915; M.E., 1939; Reg. Prof. Engr.

Odom, Richard Edward, Assistant Professor of Floriculture and Landscape Architecture. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; B.S., 1951; M.S., Colorado Agricultural and Mechanical College, 1953.

Oldham, William Jennings Bryan, Jr., Instructor of Mathematics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1958.

Oliver, John Eoff, Assistant Professor of Business Administration. (1959)
B.B.A., Texas, 1929; M.S., Agricultural and Mechanical College of Texas, 1937.

Oliver, John Percy, Professor of Engineering Drawing. (1936, 1956)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1936; Reg. Prof. Engr.

Olson, Edward O., Pathologist of Department of Horticulture, USDA, Substation No. 15. (1949)
B.S., South Dakota State, 1940; M.S., Colorado State, 1944; Ph.D., Louisiana State, 1948.

Olson, Robert Merle, Instructor of Civil Engineering. (1959)
B.S., Texas, 1947; M.S., Rice Institute, 1959.

Orr, Joseph Anderson, Professor of Civil Engineering. (1928, 1944)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1933; Reg. Prof. Engr.

Packenham, Edward S., Associate Professor of Business Administration. (1947, 1955)
B.S., Lombard College, 1928; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1949.

Page, John Boyd, Dean of the College, Dean of the Graduate School, and Professor of Agronomy. (1950, 1957)
B.S., Brigham Young, 1936; M.A., Missouri, 1937; Ph.D., Ohio State, 1940.

Page, John Orion, Associate Professor of Chemistry. (1948, 1951)
B.S., Rochester, 1927; Ph.D., Illinois, 1933.

Paine, Leland Shumway, Research Economist of Texas Engineering Experiment Station. (1952, 1953)
A.B., Nebraska, 1922; M.A., Wisconsin, 1926.

Palmer, Leslie Lloyd, Assistant Professor of Health and Physical Education. (1951, 1955)
B.S., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1951.

Parker, Charles Frederick, Instructor of Animal Husbandry. (1959)
B.S., Ohio State, 1957; M.S., 1958.

Parker, Grady P., Professor of Education and Head of Department of Education and Psychology. (1940, 1954)
B.A., North Texas State Teachers College, 1929; M.A., Southern Methodist, 1935; Ed.D., Texas, 1942.

Parker, Travis Jay, Professor of Geology. (1947, 1952)
B.S., Texas Technological College, 1933; M.A., Texas, 1939; Ph.D., 1952; Reg. Prof. Engr.

Parnell, Edward Douglas, Professor of Poultry Science. (1938, 1943)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1934.

Parry, Douglas Farlow, Director of Remedial Services, Basic Division, and Professor of Education and Psychology. (1956)
B.A., Utah, 1937; M.A., 1938; Ph.D., Syracuse, 1942.

Paterson, Donald R., Associate Horticulturist, Department of Horticulture. (1952, 1956)
B.S., Cornell, 1947; M.S., California, 1950; Ph.D., Michigan State, 1952.

Patrick, Keith Hilton, Assistant Professor of Agronomy. (1959)
B.S., Oklahoma State, 1951; M.S., 1954.

Patterson, LaVerne Victory, Assistant Professor of Industrial Education. (1956)
B.S., Illinois, 1940; M.S., 1948.

Patterson, Raleigh Elwood, Vice Chancellor for Agriculture. (1958, 1959)
B.S., Louisiana State, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., 1943.

Patton, Robert Hoover, Assistant Professor of Chemistry. (1957)
B.S., Miami, 1948; M.S., 1951; Ph.D., Florida, 1955.

Peach, Robert Marvin, Major, Associate Professor of Military Science and Tactics. (1959)
B.A., Randolph-Macon College, 1941.

Pearcy, Carl Mark, Jr., Assistant Professor of Mathematics. (1959)
B.A., Agricultural and Mechanical College of Texas, 1954; M.S., 1956.

Pedigo, John Randolph, Associate Professor of Petroleum Engineering. (1953)
B.S., Texas, 1935; B.A., 1935.

Peirce, James Franklin, Assistant Professor of English. (1946, 1951)
A.B., Illinois, 1940; M.A., Iowa, 1942.

Penberthy, Walter Lawren, Professor of Health and Physical Education. (1926, 1959)
B.S., Ohio State, 1926.

Perry, Bruce A., Horticulturist, Department of Horticulture. (1946, 1951)
B.S., Wake Forest College, 1930; M.A., 1936; Ph.D., Virginia, 1942.

Perry, Haile Deucalion, Assistant Professor of Mathematics. (1955, 1959)
B.S., Sam Houston State Teachers College, 1939; M.A., 1949.

Perry, John Vivian, Jr., Assistant Professor of Mechanical Engineering. (1949, 1955)
B.S., Virginia Polytechnic Institute, 1947; M.S., Agricultural and Mechanical College of Texas, 1954; Reg. Prof. Engr.

Peters, Isaac Isaac, Associate Professor of Dairy Science. (1950, 1952)
B.S.A., Manitoba, 1942; M.S., Michigan State College, 1944; Ph.D., Iowa State College, 1947.

Pinnell, Charles, Assistant Professor of Civil Engineering. (1958)
B.S., Texas Technological College, 1952; M.S., Purdue, 1958.

Ponthieux, Nicholas Archibald, Associate Professor of Health and Physical Education. (1941, 1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1950.

Porter, Kenneth Boyd, Agronomist of Department of Agronomy. (1947, 1957)
B.S., Kansas State College, 1940; M.S., Iowa State College, 1947; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Potter, George Edwin, Professor of Zoology. (1939)
B.S., Ottawa, 1921; M.S., Iowa, 1923; Ph.D., 1927; D.Sc., Ottawa, 1946.

Potter, James Gregor, Professor of Physics and Head of Department. (1945)
B.S., Princeton, 1928; M.S., New York, 1931; Ph.D., Yale, 1939.
(On leave of absence.)

Potts, Richard Carmechial, Professor of Agronomy and Assistant Dean of Agriculture. (1936, 1957)
B.S., Oklahoma Agricultural and Mechanical College, 1935; M.S., Agricultural and Mechanical College of Texas, 1945; Ph.D., Nebraska, 1950.

Powell, Francis Warren, Assistant Professor of English. (1937, 1944)
B.A., Austin College, 1920; M.A., Texas, 1928.

Prescott, John Mack, Professor of Biochemistry and Nutrition. (1952, 1959)
B.S., Southwest Texas State Teachers College, 1941; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., Wisconsin, 1952.

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; D.V.M., 1949; M.S., 1956.

Price, Manning A., Associate Professor of Entomology. (1940, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1941; Ph.D., Wisconsin, 1952.

Provost, Richard Leon, Counselor and Instructor, Basic Division. (1956, 1957)
B.A., Drake, 1951; M.S., 1956.

Putnam, Harlan Ray, Associate Professor of Economics. (1941, 1946)
B.S., Iowa State College, 1935; M.A., 1941.

Quinby, John Roy, Agronomist of Texas Agricultural Experiment Station, Chillicothe. (1924, 1925)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Quisenberry, John Henry, Professor of Poultry Science and Head of Department. (1936, 1946)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., Illinois, 1933; Ph.D., 1936.

Rae, Kenneth MacFarlane, Professor of Oceanography and Meteorology. (1957, 1959)
B.S., University College, London, 1935; Ph.D., London, 1958.

Rakoff, Henry, Associate Professor of Chemistry. (1953, 1957)
B.S., City College of New York, 1944; M.S., Purdue, 1948; Ph.D., 1950.

Ramge, John Christian, Associate Professor of Veterinary Medicine and Surgery. (1959)
D.V.M., Ohio State, 1942; M.S., 1950; Ph.D., 1955.

Ramsey, Jerry Dwain, Instructor of Industrial Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1955.

Randall, John Del, Professor of Nuclear Engineering. (1958, 1959)
B.S., California, 1955; M.S., 1956.

Randolph, Neal Malcolm, Associate Professor of Entomology. (1957)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1938.

Ransdell, Clifford Howell, Associate Director of the Basic Division and Professor of Engineering Drawing. (1937, 1959)
B.S., Texas Technological College, 1937; B.S., Agricultural and Mechanical College of Texas, 1953; Sc.D., Howard Payne College, 1956; M.Ed., Texas, 1957; Reg. Prof. Engr.

Rao, Narasimba Ramachandra, Instructor of Physics. (1956)
B.S., Bombay, 1941; M.S., 1950.

Ray, Sammy Mehedy, Assistant Professor of Oceanography. (1959)
B.S., Louisiana State, 1942; M.A., Rice Institute, 1952; Ph.D., 1954.

Redden, Joseph Eugene, Assistant Professor of Journalism. (1959)
B.A., Hardin-Simmons, 1947; M.A., 1948.

Redmond, Harold Edwin, Professor of Veterinary Medicine and Surgery. (1940, 1952)
D.V.M., Agricultural and Mechanical College of Texas, 1939.

Reeves, Robert Gatlin, Professor of Genetics. (1928, 1947)
B.S., Mississippi State College, 1922; M.S., 1923; Ph.D., Iowa State College, 1928.

Reid, Robert Osborne, Professor of Oceanography and Meteorology. (1951, 1959)
B.E., Southern California, 1946; M.S., Scripps Institute of Oceanography, 1948.

Reinhard, Henry J., Professor of Entomology. (1947)
B.S., Ohio State, 1915.

Reiser, Raymond, Professor of Biochemistry and Nutrition. (1949, 1954)
A.B., Western Reserve, 1929; Ph.D., Ohio State, 1936.

Rekoff, Michael George, Jr., Assistant Professor of Electrical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955; Reg. Prof. Engr.

Remele, Jack H., Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1957)
B.S., Pittsburgh, 1940.

Rhodes, Robert Raymond, Associate Professor of Range and Forestry. (1946, 1954)
B.S.F., Louisiana, 1937; M.S., Agricultural and Mechanical College of Texas, 1951.

Rhodes, William Herschel, Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Arkansas State College, 1949.

Richardson, Luther Ray, Professor of Biochemistry and Nutrition. (1946, 1949)
B.S., Georgetown College, 1923; A.M., Missouri, 1928; Ph.D., 1932.

Richmond, Thomas Rollin, Agronomist of Department of Agronomy (Agricultural Research Service, USDA, cooperating). (1931, 1954)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1938; Ph.D., Minnesota, 1948.

Rife, William Thomas, Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1950.

Riggs, John Kamm, Professor of Animal Husbandry. (1941, 1955)
B.S., Iowa State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1941.

Roberts, Jesse Claude, Jr., Assistant Professor of History. (1956, 1957)
B.S., Sam Houston State Teachers College, 1949; B.A., 1950; M.A., Texas, 1953; Ph.D., 1955.

Roberts, Sidney I., Instructor of History. (1956)
B.S., College of the City of New York, 1952; M.A., Columbia, 1953.

Roche, John Edward, Associate Professor of Business Administration. (1957)
B.S., Baylor, 1946; M.A., Texas, 1950; Ph.D., 1956.

Rode, Norman Frederick, Professor of Electrical Engineering. (1922, 1930)
B.S., Clemson College, 1919; M.S., Agricultural and Mechanical College of Texas, 1929; E.E., Clemson College, 1939; Reg. Prof. Engr.

Rodewald, Fred Arthur, Instructor of English. (1959)
B.A., Agricultural and Mechanical College of Texas, 1958; M.A., North Texas State College, 1959.

Roeber, Charles Arthur, Business Manager. (1929, 1954)
B.B.A., Texas, 1929; B.A., 1929.

Rogers, Bruce Allison, Professor of Mechanical Engineering. (1957)
B.S., Iowa State College, 1916; M.S., Chicago, 1920; Ph.D., Harvard, 1933; Reg. Prof. Engr.

Romane, William Murry, Assistant Professor of Veterinary Medicine and Surgery. (1956, 1957)
D.V.M., Agricultural and Mechanical College of Texas, 1943.

Romieniec, Edward John, Associate Professor of Architecture. (1956)
B.S., Illinois, 1947; M.S., 1948; M.A., Harvard, 1950.

Roots, Edmund Nelson, Jr., Assistant Professor of Electrical Engineering. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956.

Rosberg, David William, Professor of Plant Physiology and Pathology. (1950, 1959)
B.A., St. Olaf College, 1940; M.S., Ohio State, 1946; Ph.D., 1949.

Rose, Aaron, Director of Texas Engineering Experiment Station. (1958)
B.S., West Virginia, 1940; M.S., 1942; Ph.D., Ohio State, 1949.

Rose, Norman Carl, Assistant Professor of Chemistry. (1956)
B.S., California, 1950; Ph.D., Kansas, 1957.

Ross, Henry, Professor of Agricultural Education. (1935)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1935. (On leave of absence.)

Rotsch, Melvin Medford, Professor of Architecture. (1950, 1955)
B.S., Texas, 1928; M.Arch., Harvard, 1930.

Rowan, Neilon Joyce, Assistant Professor of Civil Engineering. (1959)
B.S., Texas Technological College, 1957; M.S., Agricultural and Mechanical College of Texas, 1959.

Rudder, James Earl, President of the College. (1958, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932.

*Rudderow, William Henry, Instructor of Aeronautical Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1960.

Rupel, Isaac Walker, Professor of Dairy Science and Head of Department. (1945)
B.S., Illinois, 1923; M.S., Wisconsin, 1924; Ph.D., 1932.

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*Resigned January 31, 1960.

Russell, Daniel, Professor of Rural Sociology. (1926)
A.B., Baylor, 1922; A.M., Chicago, 1928.

Russell, Leon Horace, Jr., Assistant Professor of Veterinary Public Health. (1959)
B.S., Missouri, 1956; D.V.M., 1956; M.P.H., Tulane, 1958.

Russell, Ralph Keith, Assistant Professor of Physics. (1946, 1955)
B.S., Nebraska State Teachers College, 1936; M.S., Agricultural and Mechanical College of Texas, 1954.

Russell, William Low, Professor of Geology. (1946, 1951)
B.A., Yale, 1920; M.S., 1922; Ph.D., 1927.

Ryan, Cecil Benjamin, Assistant Professor of Poultry Science. (1947, 1949)
B.S., Texas College of Arts and Industries, 1938; M.S., Agricultural and Mechanical College of Texas, 1947.

Saenz, Gerardo, Instructor of Modern Languages. (1959)
B.A., Sul Ross State College, 1949; M.A., 1950; Ph.D., Texas, 1959.

St. John, James Evans, Assistant Professor of Architecture. (1959)
B.A., Oklahoma State, 1950; M.A., Cranbrook Academy of Art, 1952.

Sandstedt, John Leonard, Instructor of Business Administration. (1954)
B.A., Texas, 1942; LL.B., 1947.

*Sargent, Fredric Oberlin, Assistant Professor of Agricultural Economics. (1956)
B.A., Colby College, 1942; Ph.D., Wisconsin, 1952.

Sasaki, Yoshikazu, Research Scientist in Oceanography and Meteorology. (1956, 1957)
M.S., Tokyo, 1950; Ph.D., 1955.

Saucier, Walter Joseph, Professor of Meteorology. (1952, 1958)
B.S., Southwestern Louisiana Institute, 1942; M.S., Chicago, 1947; Ph.D., 1951.

Sauer, Edward Field, Assistant Professor of Business Administration. (1950-1954, 1959)
B.S., Indiana, 1922; LL.B., Jefferson School of Law, 1928.

Schiller, Robert Edwin, Jr., Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1949; Reg. Prof. Engr.

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences; Professor of Geography and Head of Department. (1934, 1959)
B.A., Iowa State Teachers College, 1927; M.A., Clark, 1928; Ph.D., Nebraska, 1935.

Schrader, Allen, Instructor of English. (1957)
B.S., Los Angeles State College, 1956; M.A., 1957.

Schram, Alfred Francis, Associate Professor of Chemistry. (1953, 1956)
B.A., Oklahoma, 1941; M.S., 1943; Ph.D., 1948.

Schroeder, Melvin Carroll, Associate Professor of Geology. (1954, 1956)
B.S., State College of Washington, 1942; M.S., 1947; Ph.D., 1953.

Segner, Edmund Peter, Jr., Assistant Professor of Civil Engineering. (1954, 1956)
B.S., Texas, 1949; M.S., 1952; Reg. Prof. Engr.

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*Resigned December 4, 1959.

Segrest, Herman Brazill, Professor of Health and Physical Education. (1945, 1958)
B.S., North Texas State Teachers College, 1937; M.S., 1946; M.Ed., Agricultural and Mechanical College of Texas, 1955.

Seward, Clay Luzenberg, Jr., Associate Professor of Geology. (1948, 1952)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1950; Geol.E., 1953.

Shelton, Maurice, Assistant Animal Husbandman of Texas Agricultural Experiment Station, Department of Animal Husbandry. (1950, 1957)
B.S., Tennessee, 1948; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Shepperd, James Nolen, Assistant Professor of English. (1941, 1947)
B.A., Texas, 1931; M.A., 1936.

Shubinski, Robert Parker, Instructor of Civil Engineering. (1958)
B.A., Rice Institute, 1957; B.S., 1958.
(On leave of absence.)

Simmang, Clifford Max, Professor of Mechanical Engineering and Head of Department. (1938, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1938; Ph.D., Texas, 1952; Reg. Prof. Engr.

Simmons, John William, Captain, Assistant Professor of Military Science and Tactics. (1958)
B.S., Alabama, 1950.

Sims, Stillman Austin, Associate Professor of Mathematics. (1942, 1959)
B.S., Southwest Texas State Teachers College, 1939; M.S., Agricultural and Mechanical College of Texas, 1944.

Skrabanek, Robert Leonard, Professor of Rural Sociology. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947; Ph.D., Louisiana State, 1949.

Skrivanek, John Marion, Associate Professor of Modern Languages. (1952, 1959)
B.A., Texas, 1938; M.A., 1946; Ph.D., Charles (Prague), 1948.

Slater, Joseph Nelson, Assistant Professor of Economics. (1960)
B.S., Abilene Christian College, 1941; M.A., George Peabody College, 1947.

Smerdon, Ernest Thomas, Associate Professor of Agricultural Engineering. (1959)
B.S., Missouri, 1951; M.S., 1956; Ph.D., 1959.

Smith, Elmer Gillam, Professor of Physics. (1924, 1942)
A.B., Amherst College, 1919; M.S., Agricultural and Mechanical College of Texas, 1925; B.S., 1934; M.E., 1939; Ph.D., Texas, 1941.

Smith, Fred Emmett, Professor of Geology. (1948, 1956)
B.S., Louisiana State, 1930; M.S., 1932.

Smith, Frank Miller, Associate Professor of Civil Engineering. (1948, 1957)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1939; Reg. Prof. Engr.

Smith, Hilton Atmore, Professor of Veterinary Pathology and Head of Department. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

Smith, James Clifton, Superintendent of Substation No. 3, Angleton. (1951)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947.

Smith, James Douglas, Assistant Professor of Genetics. (1959)
B.S., Iowa State College, 1950; M.S., 1956.

Smith, Ronald Edward, Instructor of Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Smith, Robert Lee, Jr., Associate Professor of Industrial Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952.

Snuggs, Roland Edward, Associate Professor of Chemistry. (1924, 1946)
A.B., Georgetown College, 1920; M.S., Florida, 1923; B.S., Agricultural and Mechanical College of Texas, 1937.

Snyder, Roy Webster, Extension Meat Specialist, Texas Agricultural Experiment Station. (1930)
B.S., Iowa State College, 1921; M.S., 1922.

Sorensen, Anton Marinus, Jr., Associate Professor of Animal Husbandry. (1955, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., Cornell, 1951; Ph.D., 1953.

Sorensen, Harold Benjamin, Associate Professor of Agricultural Economics and Sociology. (1951, 1956)
B.S., South Dakota State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Sorenson, Jerome Wallace, Professor of Agricultural Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1948.

Sorrels, Joseph Harrell, Professor of Civil Engineering. (1941, 1948)
A.B., Texas Christian, 1924; M.S., Vanderbilt, 1925; B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

Southern, John Hoyle, Associate Professor of Agricultural Economics. (1959)
B.S., Oklahoma Agricultural and Mechanical College, 1936; M.S., Agricultural and Mechanical College of Texas, 1949.

Sperry, John Jerome, Professor of Biology. (1941, 1951)
B.A., Nebraska, 1936; M.A., Missouri, 1938; Ph.D., Nebraska, 1942.

Sperry, Omer Edison, Professor of Range and Forestry. (1946, 1949)
A.B., Peru, Nebraska State College, 1925; M.A., Nebraska, 1931; Ph.D., 1934.

Spurlock, William W., Instructor of Chemistry. (1958)
B.A., Daniel Baker College, 1924.

Stallings, Henry Green, Instructor of Mechanical Engineering. (1946)

Stark, Lawrence Edward, Associate Professor of Engineering Drawing. (1941, 1951)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1951.

Staten, Raymond D., Assistant Professor of Agronomy. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1947; M.S., Nebraska, 1949; Ph.D., 1951.

Stelly, Randall, Assistant Professor of Agricultural Economics and Sociology. (1956)
B.S., Southwestern Louisiana Institute, 1940; M.S., Agricultural and Mechanical College of Texas, 1947; Ph.D., Louisiana State, 1956.

Stephenson, Henson Knowlen, Professor of Civil Engineering. (1945, 1957)
B.S., Alabama Polytechnic Institute, 1923; M.S., Michigan, 1931; C.E., Alabama Polytechnic Institute, 1941.

Stern, Louis Harold, Assistant Professor of Economics. (1955, 1957)
B.S., Illinois, 1947; M.A., California, 1954.

Stevenson, Leland Lewis, Captain, Assistant Professor of Military Science and Tactics. (1960)
B.S., Agricultural and Mechanical College of Texas, 1948.

Stevenson, Robert M., Professor of Business Administration. (1947)
B.A., Duke, 1937; M.A., Pennsylvania State College, 1946; C.P.A., 1948; D.B.A., Indiana, 1955; C.L.U., 1955.

Stewart, Billy Ray, Instructor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1959.

Stewart, Norman Arthur, Jr., Associate Professor of Business Administration. (1946, 1957)
LL.B., Baylor, 1938.

Stipe, Dennis Ray, Instructor of Agricultural Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Stokes, Elmore Ewing, Jr., Associate Professor of English. (1951, 1958)
B.A., Texas, 1943; M.A., 1948; Ph.D., 1951.

Storey, James Benton, Assistant Professor of Horticulture. (1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1953; Ph.D., California, 1957.

Street, William Ezra, Professor of Engineering Drawing and Head of Department. (1941)
B.S., Texas Technological College, 1930; M.A., 1933; LL.D., Harding College, 1947; Reg. Prof. Engr.

Sweet, Dale Vernon, Associate Professor of Floriculture and Landscape Architecture. (1959)
B.S., Michigan State, 1949; M.S., 1951; Ph.D., 1956.

Swinson, Weldon Frank, Instructor of Mechanical Engineering. (1959)
B.A., Rice Institute, 1954; B.S., Texas Technological College, 1956.

Taylor, Lloyd Chamberlain, Jr., Assistant Professor of History. (1956, 1958)
B.A., Lehigh, 1949; M.A., 1951; Ph.D., 1956.

Taylor, Lloyd Hughes, Jr., Assistant Professor of Business Administration. (1959)
B.B.A., Baylor, 1949; M.A., 1950.

Tefertiller, Kenneth Ray, Assistant Professor of Agricultural Economics. (1959)
B.S., Oklahoma State, 1952; M.S., 1957; Ph.D., Illinois, 1959.

Terwey, Peter, Jr., Assistant Professor of Mathematics. (1959)
B.A., Texas Western College, 1943; M.A., Texas, 1949.

Thames, Walter Hendrix, Jr., Associate Professor of Plant Physiology and Pathology. (1959)
B.S.A., Florida, 1947; M.A., 1948; Ph.D., 1959.

Thompson, Herbert Gordon, Jr., Associate Professor of Business Administration. (1951, 1954)
B.S., Miami, 1947; M.B.A., 1949.

Thompson, John George Hatch, Professor of Mechanical Engineering. (1938, 1954)
B.S., Pennsylvania State College, 1933; M.E., 1938; M.S., Agricultural and Mechanical College of Texas, 1950; Reg. Prof. Engr.

Thornton, William Lee, Instructor of Business Administration. (1958)
B.A., Indiana, 1957; M.B.A., 1958.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology and Head of Department. (1947, 1953)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1936; M.P.A., Harvard, 1947; D.P.A., 1949.

Tishler, Carl Edward, Professor of Health and Physical Education and Head of Department. (1941, 1947)
B.S., Ohio State, 1926; M.A., Western Reserve, 1935.

Tittle, Morris Edward, Associate Professor of Mathematics. (1943, 1959)
B.A., East Texas State Teachers College, 1923; M.A., Texas, 1937.

Tomme, Warren James, Instructor of Chemical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1957.

Traxler, Ralph N., Professor of Civil Engineering. (1959)
A.B., Colorado, 1920; M.A., 1922; Ph.D., Wisconsin, 1926.

Trogdon, William O., Professor of Agronomy and Head of Department. (1958)
B.S., Oklahoma State, 1942; Ph.D., Ohio State, 1949.

*Trotter, Ide Peebles, Associate Dean of the Graduate School and Professor of Agronomy. (1936, 1956)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918; M.S., 1921; Ph.D., Wisconsin, 1933.

Truettner, Willard Irving, Professor of Mechanical Engineering. (1930, 1943)
B.S., Michigan, 1928; M.S.E., 1930; Reg. Prof. Engr.

Turk, Richard Duncan, Professor of Veterinary Parasitology and Head of Department. (1944)
D.V.M., Kansas State College, 1933; M.S., Agricultural and Mechanical College of Texas, 1939.

Turney, H. A., Assistant Professor of Entomology. (1958)
B.S., Arkansas, 1952; M.S., 1956.

Vanderzant, Carl, Associate Professor of Dairy Science. (1953, 1957)
B.S., Wageningen, 1947; M.S., 1949; M.S., Iowa State College, 1950; Ph.D., 1953.

Vanderzant, Erma Schumacher, Biochemist of Department of Biochemistry and Nutrition. (1954)
B.S., Iowa State, 1943; Ph.D., 1953.

Varvel, Walter A., Professor of Psychology. (1941, 1945)
A.B., Kansas, 1932; M.A., 1933; Ph.D., 1938.

Vezey, Edward Earl, Professor of Physics. (1920, 1938)
B.S., Oklahoma Agricultural and Mechanical College, 1910; M.S., Agricultural and Mechanical College of Texas, 1927.
(On leave of absence.)

Vrooman, Richard, Associate Professor of Architecture. (1949, 1955)
B.A., Oberlin College, 1941; B.Arch., Western Reserve, 1949; M.Arch, Agricultural and Mechanical College of Texas, 1952; Reg. Prof. Arch.

Wagner, William Grant, Assistant Professor of Architecture. (1954, 1956)
B.Arch., Texas, 1949; Reg. Prof. Arch.

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*Retired effective January 16, 1960.

Wainerdi, Richard Elliott, Assistant to the Dean of Engineering and Associate Professor of Petroleum Engineering. (1957, 1959)
B.S., Oklahoma, 1952; M.S., Pennsylvania State, 1955; Ph.D., 1958.

Waldrip, William Jasper, Assistant Professor of Range and Forestry. (1950, 1952)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Wallmo, Olof Charles, Associate Professor of Wildlife Management. (1955, 1959)
B.S., Utah State Agricultural College, 1946; M.S., Wisconsin, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Walton, Ernest Vernon, Professor of Agricultural Education and Head of Department. (1946, 1953)
B.S., Agricultural and Mechanical College of Texas, 1937; M.S., 1947.

Walton, Henry Harrison, Instructor of Health and Physical Education. (1958)
B.S., Northwestern State College, 1957; M.S., 1958.

Wamble, Albert Cecil, Research Engineer of Texas Engineering Experiment Station. (1945)
B.S., Agricultural and Mechanical College of Texas, 1933.

Wapple, Albert Russell, Instructor of Mathematics. (1942)
B.S., California, 1914; M.A., 1915.

Ward, Robert Page, Professor of Electrical Engineering. (1925, 1943)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Watkins, Gustav McKee, Dean of the School of Agriculture and Professor of Plant Physiology and Pathology. (1949, 1958)
B.A., Texas, 1929; M.S., 1930; Ph.D., Columbia, 1935.

Watkins, Thomas David, Jr., Professor of Animal Husbandry. (1954)
B.S., California, 1940; M.S., 1947; Ph.D., Maryland, 1954.
(On leave of absence.)

Weekes, Donald Fessenden, Professor of Physics and Acting Head of Department. (1937, 1959)
B.S., Middlebury College, 1924; M.A., Amherst College, 1926; Ph.D., Cornell, 1937.

Weihing, Ralph Martin, Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Colorado Agricultural and Mechanical College, 1930; M.S., Nebraska, 1932; Ph.D., 1934.

Weihs, Phillip Donald, Captain, Assistant Professor of Air Science. (1957)
B.B.A., St. Mary's, 1949.

Weiner, Peter Douglas, Assistant Professor of Mechanical Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1954.

Weitzel, Hulbert F., Captain, Assistant Professor of Air Science. (1958)
B.B.A., Houston, 1949.

Welch, Nathan Edgar, Instructor of Chemical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1956.

Wells, Charles B., Jr., Major, Associate Professor of Air Science. (1959)
B.A., Georgia, 1941.

*Wells, Otis Dean, Instructor of Aeronautical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1957.

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*Resigned effective January 31, 1960.

Whealy, Roger Dale, Professor of Chemistry. (1958)
B.S., Eastern Normal, South Dakota, 1930; M.S., Colorado, 1937; M.S., Oregon, 1948; Ph.D., Colorado, 1953.

Whitehouse, Ulysses Grant, Technical Director, Electron Microscope Laboratory, Biochemistry and Nutrition Department. (1953)
B.S., Kentucky, 1940; M.S., 1941; M.S., Iowa, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Whitehurst, Charles Augustus, Instructor of Mechanical Engineering. (1959)
B.S., Louisiana State, 1956; M.S., Southern Methodist, 1959.

Whiteley, Eli Lamar, Associate Professor of Agronomy. (1946, 1959)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., North Carolina State, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Whiting, Robert Louis, Professor of Petroleum Engineering and Head of Department. (1946, 1954)
B.S., Texas, 1939; M.S., 1943; Reg. Prof. Engr.

Whitmore, Frank Charles, Assistant Professor of Physics. (1951, 1956)
A.B., Gettysburg College, 1949; M.A., Delaware, 1951.

Whitney, Howard Stephen, Assistant Professor of Agricultural Economics. (1954)
B.S., Oklahoma Agricultural and Mechanical College, 1943; M.S., 1948.

Whitson, Samuel Mont, Instructor of Agricultural Economics. (1959)
B.A., Abilene Christian College, 1950; M.A., Butler, 1951.

Whittington, William E., Associate Professor of Business Administration. (1954, 1957)
B.B.A., Texas, 1939; M.B.A., 1947; Ph.D., Illinois, 1957.

Wieder, Russell Karl, Instructor of Health and Physical Education. (1956)
B.A., Kenyon College, 1942.

Wiening, Victor, Assistant Professor of English. (1952, 1956)
B.A., Valparaiso, 1947; M.A., Louisiana State, 1949.

Wilkes, Lambert Henry, Associate Professor of Agricultural Engineering. (1957)
B.S., Clemson Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Williams, Gene Franklin, Captain, Assistant Professor of Air Science. (1958)
B.B.A., Oklahoma, 1951.

Williams, Mack Lester, Instructor of Mathematics. (1955)
B.S., North Texas State Teachers College, 1942; M.S., 1949.

Wilson, Basil Wrigley, Professor of Oceanography. (1953, 1959)
B.S., Capetown, 1931; M.S., Illinois, 1939; C.E., 1940; D.Sc., Capetown, 1953.

Wingren, Roy Matthew, Professor of Mechanical Engineering. (1928, 1943)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1934; Reg. Prof. Engr.

Wolf, Kenneth, Major, Associate Professor of Air Science. (1959)
B.B.A., Baylor, 1955.

Wood, Norris Philip, Assistant Professor of Microbiology. (1955)
B.S., Hartwick College, 1949; M.S., Cornell, 1951; Ph.D., Pennsylvania, 1955.

Wood, Robert Porter, Associate Professor of Business Administration. (1948, 1955)
B.B.A., Sam Houston State Teachers College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1951.

Woods, Paul Joseph, Associate Professor of History. (1946, 1955)
B.A., Illinois, 1938; M.A., 1940; Ph.D., 1941.

Woolket, Joseph John, Professor of Modern Languages and Head of Department. (1925, 1945)
A.B., Oberlin College, 1924; M.A., 1925.

Worley, Willard Parker, Instructor of Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947.

Wright, Samuel Robert, Professor of Civil Engineering and Head of Department. (1923, 1946)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1928; C.E., 1931; Ph.D., 1946; Reg. Prof. Engr.

Wykes, Stanley Allen, Professor of Industrial Engineering. (1947, 1951)
B.S., Pennsylvania State College, 1940; M.S., Virginia Polytechnic Institute, 1946; Reg. Prof. Engr.

Wynes, Charles Eldridge, Instructor of History. (1958)
B.S., Madison, 1952; M.A., Virginia, 1957.

Wythe, Landon Douglas, Jr., Assistant Professor of Animal Husbandry. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955.

Yantis, Theodore R., Professor of Business Administration. (1952, 1956)
A.B., Otterbein College, 1947; M.B.A., Ohio State, 1949; Ph.D., 1955.

Young, Paul A., Plant Pathologist of Texas Agricultural Experiment Station, Jacksonville. (1935)
B.S., Wabash College, 1921; M.A., Illinois, 1923; Ph.D., 1925.

Zimmerman, Howard Karl, Jr., Associate Professor of Chemistry. (1952, 1955)
B.S., Washington, 1942; M.A., Leland Stanford, 1944; Ph.D., Oregon, 1948.

Zingaro, Ralph Anthony, Associate Professor of Chemistry. (1954, 1959)
B.S., City College of New York, 1946; M.S., Kansas, 1949; Ph.D., 1950.

Zinn, Bennie A., Director of Student Personnel Services. (1945, 1958)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1928.

## SUMMARY OF THE COLLEGE STAFF AS OF FEBRUARY 1, 1960

| | Active | On Leave | Total |
|---|---|---|---|
| College Administrative Officers | 9 | 0 | 9 |
| Full Professors, including Heads of Department and Divisions | 192 | 7 | 199 |
| Associate Professors | 150 | 2 | 152 |
| Assistant Professors | 165 | 6 | 171 |
| Instructors | 85 | 4 | 89 |
| Other Members of the Academic Council | 7 | 0 | 7 |
| Other Members of the Graduate Faculty | 44 | 0 | 44 |
| Total | 652 | 19 | 671 |

## RETIRED FACULTY MEMBERS

Bagley, John Brewer, Professor Emeritus of Cotton Marketing. (1905, 1947)
B.A., Wake Forest College, 1900.

Bolton, Frank Cleveland, President Emeritus of the College. (1909, 1950)
B.S., Mississippi State College, 1905; M.S., Ohio State, 1928; LL.D., Austin College, 1932; LL.D., Agricultural and Mechanical College of Texas, 1951.

Brewer, Alexander Van, Professor Emeritus of Mechanical Engineering. (1922, 1957)
B.S., Purdue, 1913; M.E., 1925; M.S., Agricultural and Mechanical College of Texas, 1937; Reg. Prof. Engr.

Campbell, Charles Boyle, Professor Emeritus of Modern Languages. (1903, 1948)
Ph.B., DePauw, 1900; Ph.D., Chicago, 1912.

Cofer, David Brooks, Professor of English and Archivist Emeritus. (1910, 1957)
A.B., Centre College, 1907; M.A., Wisconsin, 1927.

Darnell, Albert Laurie, Professor Emeritus of Dairy Science. (1914, 1957)
B.S., Mississippi State College, 1914; M.A., Missouri, 1916.

Dunn, Ralph Clark, Professor Emeritus of Veterinary Bacteriology and Hygiene. (1911, 1950)
D.V.M., Ohio, 1911.

Gammon, Samuel Rhea, Professor Emeritus of History. (1925, 1957)
A.B., Washington and Lee, 1911; M.A., 1913; Ph.D., Johns Hopkins, 1921.

Gunter, Percy Glyndon, Professor Emeritus of English. (1911, 1955)
A.B., Elon College, 1909; M.A., North Carolina, 1910.

Harter, Edward Lin, Associate Professor Emeritus of Chemistry. (1921, 1959)
A.B., Missouri Wesleyan, 1919; M.A., Kansas, 1927.

Hedges, Charles Cleveland, Professor Emeritus of Organic Chemistry. (1912, 1957)
B.S., Kentucky, 1906; A.B., Cornell, 1908; Ph.D., 1912.

Jensen, Frederick William, Distinguished Professor Emeritus of Chemistry. (1925, 1959)
B.S., Nebraska, 1920; M.S., 1923; Ph.D., 1925.

Jones, Beecher Calvin, Assistant Professor Emeritus of Chemistry. (1921, 1947)
A.B., Baylor, 1921; B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1926.

Jones, David Cluie, Professor Emeritus of Mathematics. (1909, 1956)
A.B., Emory, 1908.

Jones, Fred Rufus, Professor of Agricultural Engineering. (1921, 1958)
B.S., Wisconsin, 1915; M.S., Iowa State College, 1931.

Key, Percy Clark, Associate Professor Emeritus of English. (1924, 1957)
B.A., Texas Christian, 1917; M.A., Vanderbilt, 1918.

Kyle, Edwin Jackson, Dean Emeritus of the School of Agriculture. (1902, 1945)
B.S., Agricultural and Mechanical College of Texas, 1899; B.S.A., Cornell, 1901; M.S.A., 1902; D.Sc., Arkansas, 1941.

Langford, Ernest, Professor Emeritus of Architecture. (1915, 1957)
B.S., Agricultural and Mechanical College of Texas, 1913; M.S., Illinois, 1924; Reg. Prof. Arch.

Lenert, August Albert, Professor Emeritus of Veterinary Medicine and Surgery. (1919, 1958)
B.S., Agricultural and Mechanical College of Texas, 1914; D.V.M., Kansas City Veterinary College, 1917.

McGinnis, Nestor Massie, Professor Emeritus of Floriculture and Landscape Architecture. (1915, 1953)
B.S., Agricultural and Mechanical College of Texas, 1908.

Markle, Elias Ward, Professor Emeritus of Electrical Engineering. (1921, 1957)
B.S., Pennsylvania State College, 1913; M.S., Agricultural and Mechanical College of Texas, 1930.

Mogford, Joseph Sayers, Professor of Agronomy. (1925, 1937)
B.S., Agricultural and Mechanical College of Texas, 1916; M.S., 1920.

Nelson, Thomas Robert, Associate Professor Emeritus of Mathematics. (1925, 1957)
B.A., East Texas Normal College, 1917; M.A., Texas, 1922.

Overall, John Wayne, Instructor of Physics. (1943, 1957)
A.B., Baylor, 1921; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Porter, Walter Lee, Professor Emeritus of Mathematics. (1918, 1959)
A.B., Howard College, 1911; M.S., Agricultural and Mechanical College of Texas, 1926.

Potts, William McDaniel, Professor Emeritus of Chemistry. (1926, 1958)
B.S., Chicago, 1921; M.S., 1927; Ph.D., 1937.

Richey, John Jefferson, Professor Emeritus of Civil Engineering. (1912, 1959)
B.S., Illinois, 1903; C.E., 1910.

Sandstedt, Card Edward, Professor Emeritus of Civil Engineering. (1923, 1959)
A.B., Leland Stanford, 1910; M.S., Agricultural and Mechanical College of Texas, 1928; Reg. Prof. Engr.

Silvey, Oscar William, Professor Emeritus of Physics. (1916, 1951)
A.B., Indiana, 1907; A.M., 1910; Ph.D., Chicago, 1915.

Summey, George, Jr., Professor Emeritus of English. (1922, 1951)
A.B., Southwestern Presbyterian, 1897; M.A., 1899; Ph.D., Columbia, 1919.

*Trotter, Ide Peebles, Dean Emeritus of the Graduate School and Professor Emeritus of Agronomy. (1936, 1960)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918: M.S., 1921; Ph.D., Wisconsin, 1933.

Weaver, Paul, Distinguished Professor of Geology and Geophysics. (1953)
A.B., Columbia, 1908; Reg. Prof. Engr.

Wilcox, George Barton, Professor Emeritus of Education and Psychology. (1920, 1959)
B.S., Sam Houston State Teachers College, 1912; B.S., Agricultural and Mechanical College of Texas, 1923; A.M., Columbia, 1926.

Winkler, Charles Herman, Professor Emeritus of Psychology. (1923, 1946)
B.S., Texas, 1904; M.A., 1914; Ph.D., Missouri, 1916.

Young, Vernon Alphus, Professor of Range and Forestry. (1929, 1946)
B.S., Utah State Agricultural College, 1932; M.S., Iowa State College, 1924; Ph.D., Minnesota, 1929.

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*Effective January 16, 1960.

# THE COLLEGE

## HISTORICAL SKETCH

The Agricultural and Mechanical College of Texas, like the land grant institutions in other states of the Union, owes its origin to the Morrill Act, which was approved by Congress July 2, 1862. This act provided for the donation of a specified amount of public lands to the several states and territories. Proceeds from the sale of these lands were to constitute a perpetual fund, the principal of which should remain forever undiminished. The interest from this fund was to be used for the support of at least one technological college whose objective must be, without excluding other scientific and classical studies and including military tactics, to teach branches of learning pertaining to agriculture and mechanic arts in order to promote the liberal and practical education of the industrial classes in the various pursuits and professions of life. The Legislature of Texas accepted the provisions of the congressional legislation in 1866, and $174,000 was realized from the sale of lands set aside under the Act. Before the College opened, this fund had grown to $209,000 through the addition of accrued interest.

In April, 1871, the Legislature provided for the establishment of the Agricultural and Mechanical College. A commission created for the purpose of locating the college accepted the offer made by the citizens of Brazos County and located the institution on a tract of 2,416 acres of land in that county. The College was formally opened, and instruction began on October 4, 1876. Its educational activities have been enlarged as the need for such expansion became evident. At the present time both undergraduate and graduate instruction are offered not only in the fields of agriculture and engineering but also in liberal arts, science, education, business administration, and veterinary medicine.

The purchase from time to time of additional land adjacent to the original tract has increased the land owned by the College in Brazos County to approximately 5,200 acres. In 1944 the College acquired a plantation of 3,192 acres in Burleson County for experimental purposes, while in 1950 the College acquired 411 acres in Kimble County for the Junction Adjunct of the Agricultural and Mechanical College of Texas. The value of the physical plant has grown to approximately $45,000,000 and a good foundation has been laid at the College for instruction, for investigation, and for extension by means of financial aid secured from both the Congress and the State Legislature.

## LOCATION

The community of College Station has grown around the Agricultural and Mechanical College of Texas. This town boasts of churches representing the leading denominations, an excellent public school system, and adequate shopping districts to serve its citizens. Nearby Bryan supplements these advantages.

College Station is located 100 miles north of Houston, 100 miles east of Austin, and 170 miles south of Dallas. State highways, Greyhound Bus Lines, and Continental Airlines serve to connect College Station with the rest of the state. Easterwood Field, the College airport, is located approximately two miles from the Campus.

## SCHOOLS AND DEPARTMENTS

The Agricultural and Mechanical College of Texas is composed of the Basic Division; the Schools of Agriculture, Arts and Sciences, Engineering, Military Sciences, and Veterinary Medicine; and the Graduate School. The Basic Division, which is a non-degree granting school, was established to aid first-year students in their adjustment to college. After completing a year in the Basic Division, a student satisfying the entrance requirements to one of the degree-granting schools may be admitted to the School of Agriculture, the School of Arts and Sciences, or the School of Engineering. The School of Veterinary Medicine is another degree-granting school, admission to which is obtained only after completion of the program in pre-veterinary medicine and selection within the quota to be admitted for the session under consideration. The ROTC program is under the supervision of the School of Military Sciences. The Graduate School assists graduate students in developing and pursuing individual educational programs. More detailed information concerning its administration and the degrees which may be earned will be found in the Bulletin of the Graduate School.

For administrative purposes the 50 departments and divisions of instruction are assigned to the several schools as follows:

**School of Agriculture**

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Agronomy
Animal Husbandry
Biochemistry and Nutrition
Dairy Science
Entomology
Floriculture and Landscape Architecture
Genetics
Horticulture
Plant Physiology and Pathology
Poultry Science
Range and Forestry
Wildlife Management

**School of Arts and Sciences**

Biology
Business Administration
Chemistry
Economics
Education and Psychology
English
Geography
Health and Physical Education
History and Government
Journalism
Mathematics
Modern Languages
Oceanography and Meteorology
Physics

**School of Engineering**

Aeronautical Engineering
Architecture
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Drawing
Geology and Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Nuclear Engineering
Petroleum Engineering

**School of Military Sciences**

Air Science
Military Science and Tactics

**School of Veterinary Medicine**

Veterinary Anatomy
Veterinary Medicine and Surgery
Veterinary Microbiology
Veterinary Parasitology
Veterinary Pathology
Veterinary Physiology and Pharmacology
Veterinary Public Health

## LIBRARY FACILITIES

THE COLLEGE LIBRARY: The air-conditioned Cushing Memorial Library Building, erected in 1930 at a cost of $250,000, houses the main collection numbering over 300,000 volumes, including files of federal and state documents and bound periodicals. The library is a designated depository for federal documents on a selective basis. The periodical collection has been implemented greatly within the past few years through the acquisition of many scarce sets of foreign scientific journals and the addition of many new periodical subscriptions. The library receives currently over 2,700 periodicals and other serials, as well as some fifty state and national newspapers.

The library has been developed chiefly along reference and technical lines, and a good general reading collection has been accumulated. Funds from the Exchange Store and generous contributions from the A. and M. Mothers' Clubs throughout the State have been used to increase substantially the collection of fiction and non-technical popular material. The careful selection of new books keeps the collection abreast of modern thought. With the exception of periodicals, government documents, and certain books temporarily reserved by departments for reference or required reading all books are loaned for home use for a period of two weeks with the privilege of renewal for the same length of time, unless the book is requested meanwhile. A browsing room for pleasure reading and study is maintained on the third floor.

Many of the important reference works are shelved in the General Reference Room, and these include the encyclopedias, dictionaries, indexing services, directories, handbooks, and other miscellaneous materials. A staff of reference librarians is on duty at all hours. Specialized reference materials in agriculture and engineering are shelved in the Science and Agricultural Reference Room.

The College Library is also the research library of the Texas Agricultural Experiment Station and the Texas Agricultural Extension Service. Books and other materials are sent to agricultural extension agents throughout the State by mail.

During the regular session the library is open for the following hours: Weekdays, 8 a.m. to 10 p.m.; Saturdays, 8 a.m. to 12 noon; Sundays, 2 p.m. to 10 p.m. Between terms and on holidays the library is open on weekdays from 8 a.m. to 5 p.m. and on Saturdays from 8 a.m. to 12 noon, but it is closed on Sundays.

Graduate students and members of the faculty may go into the stacks, where private carrells are provided for their convenience. Each graduate student must have an identification card showing that he is doing graduate work.

BRANCH LIBRARIES: Libraries are maintained for the following schools or divisions:

**School of Veterinary Medicine.** This library is located at the east end of the first floor of the Veterinary Medicine Building and is open from 8 a.m. to 5 p.m. on weekdays; from 7:30 to 9:30 p.m. on Mondays, Wednesdays, Thursdays, and Fridays; and from 8 a.m. to 12 noon on Saturdays. It is primarily a reference library with over 8,000 volumes of books and periodicals in the fields covered by the curriculum in the School of Veterinary Medicine. The library subscribes to 350 American and foreign periodicals and receives pertinent publications from other colleges and experiment stations. Through an inter-library loan program, it has access to materials from all of the major medical libraries, thus opening to research workers an extensive coverage of the field of medical literature in all of its phases.

**Division of Architecture.** This library, located on the fourth floor of the Academic Building, furnishes reading room space and offers reference service from 8 a.m. to 5 p.m. daily. It is closed Saturdays and Sundays. The collection, numbering over 4,000 volumes of carefully selected books and periodicals, provides materials in this specialized field for all students and faculty.

**Division of Business Administration.** Another branch of the College Library, this collection numbers over 2,500 volumes of books and periodicals in the many areas of business administration, such as accounting, insurance, marketing, business law, etc. Over 100 periodicals are currently received and a file of annual reports of corporations is carefully maintained. The library is located in the west end of the first floor of Francis Hall. It is open from 1 p.m. to 5 p.m. daily and is closed Saturdays and Sundays.

**Other Libraries.** Many departments maintain working collections of books and periodicals for use within the departments. Some of the collections are fairly large and well organized; others are small but very well chosen. Use of these libraries is restricted by the departments concerned.

**The Texas Engineers' Library.** By an act of the State Legislature in 1941, the Texas State Board of Registration for Professional Engineers was given authority to establish a library for the professional engineers of Texas. It was voted by the members of the State Board of Registration for Professional Engineers that this library be established at the Agricultural and Mechanical College of Texas. The library also serves the engineering students of this college.

Late in 1952 the Texas Engineers' Library moved into its new building, later to be named the Gibb Gilchrist Engineering Library Building. The building is well lighted and furnished with the most modern equipment. The stacks are open to the students and there are several tables where they may study in this area. There are nine enclosed carrells for the use of the Registered Professional Engineers, graduate students in engineering, and faculty members. On the first floor of the building is a well lighted reference room which contains the major indexes to technical periodical literature and other science reference works. A collection of abstracts and subject bibliographies is also being implemented as part of the general plan to make it as strong a research library as possible. Also on the first floor of the building is a map room which contains several hundred atlases and maps, chiefly in the fields of geology and petroleum. At present the library has approximately 50,000 books, periodicals, documents, and other library materials. Approximately 1,400 scientific and technical periodicals are received annually, many of which are foreign. It is a well balanced collection, but is especially strong in aeronautics, air conditioning, concrete, hydrology and sanitary engineering, petroleum, and welding. The library is a complete depository for all Atomic Energy Commission technical reports. The library is open from 8 a.m. to 5 p.m. on weekdays and on Saturdays from 8 a.m. to 12 noon.

### BUILDINGS AND FACILITIES

The physical plant of the College includes buildings with a total valuation of approximately $25,200,000 while equipment and lands of the College represent an additional valuation of $19,800.000. Included among these buildings are the Data Processing Center, the Memorial Student Center, the Cushing Memorial Library, the Gibb Gilchrist Engineering Library, the Richard Coke Building, the G. Rollie White Coliseum, the All Faiths Chapel, the auditorium, hospital, Y.M.C.A., supply store, office buildings, numerous classroom buildings with laboratory and shop facilities for the various departments, and many barns providing facilities for handling the various classes of livestock used in demonstration and laboratory work in the Schools of Agriculture and Veterinary Medicine. Athletic facilities consist of a stadium, field house and natatorium, baseball diamond and bleachers, golf course, and numerous tennis courts and practice fields. Twenty-four dormitories are located conveniently on the campus, and two dining halls are in operation. The College operates 778 apartments for married students in areas near the campus.

## ACADEMIC REGULATIONS

Certain academic regulations have been set up by the faculty for the purpose of assisting the student to secure the maximum benefit from his studies. These regulations, contained in the copy of **College Regulations** given to each student when he enters the College, serve as a guide in such important matters as choice of course and subjects, methods of study, attendance, examinations, promotion, and graduation.

By means of reports at regular intervals, frequent conferences with the deans, the Registrar, Office of the Dean of Students and members of the teaching staff, the authorities of the College keep in close touch with the student's progress; and such advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with his studies, the student may at any time be dropped from the rolls of the College.

The College reserves the right to modify the curricula or withdraw any course when it appears wise to do so.

## DEGREES OFFERED

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Arts (B.A.)
Bachelor of Business Administration (B.B.A.)
Bachelor of Science (B.S.)
Bachelor of Architecture (B.Arch.)
Bachelor of Petroleum Engineering (B.P.E.)
Doctor of Veterinary Medicine (D.V.M.)
Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

On the basis of acceptable professional experience the following professional degrees in engineering are offered to graduates of the College:

Aeronautical Engineer (Aero.E.)
Agricultural Engineer (A.E.)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

## REQUIREMENTS FOR A BACCALAUREATE DEGREE

The diploma of the College, with the appropriate degree, will be granted to the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. He must complete one of the regular courses of study leading to a degree.

2. The total number of grade points earned at this institution in courses applied to this degree must equal at least the number of hours which he carried in courses at this institution which are applied to this degree. Grades of F or WF shall be included, except such grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated satisfactorily during the student's first four semesters in college. Grades of WP shall be excluded.

3. The total number of grade points earned at this institution in courses in his major department applicable to this degree must equal at least the number of hours which he carried at this institution in his major department which are applied to this degree. Grades of F and WF shall be included, but grades of WP shall be excluded.

4. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed such courses need not be repeated.

5. He must have settled all financial obligations to the College.

6. He must be formally recommended for graduation by the Academic Council after consideration of his complete record.

7. Unless registered in absentia or excused by his dean, he must be present in person at the graduation exercises.

These requirements must be completed and all grades on record in the Registrar's Office not later than 5 p.m. on Thursday preceding Commencement Day.

Requirements for an advanced degree are outlined in the Graduate Bulletin.

## APPLICATION FOR A DEGREE

During the semester or summer session preceding the conferring of the degree, a student must be officially registered in the College. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term, in which the student expects to complete his requirements for graduation.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must fulfill the following two conditions:

1. He must be registered for the courses necessary to complete the requirements of his curriculum.

2. For work of his final semester or summer term, he must not lack a grade point ratio in excess of 1.50 in his major field and for his over-all program of studies in order to meet the grade point requirement for graduation.

## RESIDENCE REQUIREMENT

A candidate for a Bachelor's degree must complete the requirements of the final year's work of his curriculum in residence at this institution with the exception of six semester hours, which may be accepted in transfer. However, in every case the student must complete at least 36 semester hours of the last two years of his curriculum at this institution.

A candidate for a Bachelor's degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture generally will be limited to those courses taught in the freshman and sophomore years at this institution.

## TWO DEGREES

A candidate for a second Bachelor's degree must have been in residence at least two academic years and must have completed all the essential work of the second curriculum not covered in the first; in all such cases the total amount required must be at least 30 semester hours additional to the greater number required for either degree.

## CHANGE OF CURRICULUM

Applications for change of curriculum shall be passed upon by the deans of the schools and heads of divisions concerned. A student under 21 years of age must have the written consent of his parent or guardian.

At the time of the change, the dean of the school or head of the division to which the transfer is being made will indicate any courses on the student's record which are to be excluded from requirements for his new curriculum and will so advise the Registrar.

## TRANSFER OF CREDITS

As a general policy credit will be given in transfer for work completed with a grade of C or better at another properly accredited institution. Work completed with the grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the same subject area. Any student desiring to validate work done elsewhere should discuss with the Registrar the conditions necessary for validation of his particular work and secure from him authorization for such action. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory.

Work done in an institution not properly accredited must be validated by one of the two methods of validation already mentioned before it can be transferred.

## CORRESPONDENCE COURSES

The Agricultural and Mechanical College of Texas offers no correspondence courses. A student in residence at this institution will be permitted to receive undergraduate credit for correspondence courses taken elsewhere only when written permission has been granted in advance by the dean of his school.

Credit earned in a course completed by correspondence will be accepted only after a validating examination has been passed unless the final examination is taken under the supervision of the Registrar at this college. An exception will be made in the case of courses taken through the United States Armed Forces Institute.

Not more than twelve semester hours of credit taken in correspondence work may be applied toward the requirements for a degree.

## REQUIREMENT IN GOVERNMENT AND HISTORY

In order to meet the legal requirements for a baccalaureate degree, all students must have credit for six semester hours of American history or three semester hours of American history and three semester hours of Texas history, in addition to the long-standing government requirement of Government 306 and credit for three semester hours of military or air science. For those students who do not take military or air science, six hours of government must be completed. Such students must complete Government 306 and 307.

In satisfying the government requirement for a teacher's certificate, Government 306 and 307 may be used. Government 305 will fulfill this requirement. Credit for basic military science cannot be used in satisfying this requirement.

## REQUIREMENT IN PHYSICAL EDUCATION

All students under 21 years of age at the time of entrance are required to complete Physical Education 101, 102, 201, 202.

Transfer students will be given exemption from one semester of required physical education for each semester of course work completed at the other institution.

Students who have completed as much as one year of service in the Armed Forces of the United States on active duty will be exempt from the requirement in physical education.

## REQUIREMENT IN MILITARY TRAINING

Any student entering with freshman classification (less than 30 semester hours of credit) who is a citizen of the United States, physically qualified, under 21 years of age, and who has had no previous service with the Armed Forces must successfully complete two years of military training.

Enrollment in air science or military science is synonymous with enrollment in the Corps of Cadets and is a part of military training as offered at this college. The Corps is organized into military units which are constantly under military discipline and supervision; likewise, the members of the Corps are required at all times to wear the appropriate uniform.

Members of the Corps of Cadets who are housed in military units will, upon the completion of the basic course, make application for advanced course contract, and, if qualified, be enrolled in advanced course ROTC. Students are reminded that acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of the ROTC summer camp, and acceptance of a reserve commission if one is tendered. The foregoing become integral parts of the degree requirements of advanced course ROTC students. Therefore, for those students under an advanced course ROTC contract the College will not grant a degree prior to acceptance of a reserve commission. Likewise, the reserve commission will be withheld from advanced course ROTC students who have completed requirements for a reserve commission until they have completed work for their academic degree.

## ELIGIBILITY FOR AN ADVANCED ROTC CONTRACT

To be considered for an advanced course ROTC contract a student must: (1) be morally and physically qualified, (2) attain junior classification with a minimum grade point ratio of 1.00, (3) have satisfactorily completed the ROTC basic course or have served at least one year of active military service, (4) attain a passing score on the ROTC qualifying examination.

Where the number of contracts to be awarded is for any reason limited, those candidates with the highest qualifications will receive contracts for advanced training.

## ACADEMIC CREDIT IN MILITARY TRAINING FOR EX-SERVICEMEN

Students who have completed one year of service in the Armed Forces of the United States on active duty are exempt from further military training and may be given academic credit of four semester hours for basic ROTC.

Students who have completed six months (under RFA 1955) but less than one year of active duty in the Armed Forces of the United States will be given academic credit for the first year of Army ROTC, but will be required to live in the Corps of Cadets. Such students may be given academic credit for two semester hours of Army basic ROTC. (Credit for six months' training does not apply to the Air Force ROTC.)

Students who have served for at least one year in the Armed Forces of the United States on active duty and who hold a commission are exempt from further military training and may be given academic credit of sixteen semester hours for basic and advanced ROTC.

A student wishing to receive such credit should file a photostatic or certified copy of his discharge with the Registrar's Office so that appropriate credit may be allowed.

## ENGLISH CONFERENCES

Students enrolled in courses in English composition are required to attend conferences with their instructors.

## ASSEMBLIES

In most of the teaching divisions of the College, students are required to attend assemblies at intervals during the session. Prominent speakers are presented at the assemblies for the discussion of topics of general and special interest.

## THE GRADING SYSTEM

Since one comes to college for an education, his grades are usually taken as an indication of the proficiency of his endeavors. The student's semester grade in a course is based upon recitation, written exercises and tests, laboratory work, and the final examination. The final examination has a weight of one-fourth of the final grade, and the proportionate weight assigned to each of the other factors is determined by the head of the department administering the course.

There are four passing grades signifying various degrees of achievement, and grade points are awarded on the basis of these grades.

| Grade | Description | Range (Inclusive) | Grade Points per Semester Hour |
|---|---|---|---|
| A | Excellent | 92-100 | 3 |
| B | Good | 84- 91 | 2 |
| C | Fair | 76- 83 | 1 |
| D | Passing | 70- 75 | 0 |

The lowest passing grade is 70. There is one failing grade, F, below 70, indicating work of unsatisfactory quality. Credit for a course failed may be obtained only by satisfactorily repeating the course in class, except that in a course including both theory and practice, the head of a department may excuse a student from repeating the practice if his grade in the practice is B or better, and if in the judgment of the head of the department the repetition is not necessary. The student must register for both theory and practice, however.

The temporary grade "Inc." (Incomplete) indicates that the student has satisfactorily completed the course with the exception of a major quiz, final examination, or other work. This grade is given only when the deficiency is due to authorized absence or other cause beyond the control of the student and when the work already done has been of a quality acceptable for the satisfactory completion of the course. The privilege of completing such work is limited to the end of the first month of his succeeding semester in college; otherwise the student must repeat the course in order to receive credit, unless for good reason his dean grants an extension of time.

Permission to remove a semester grade of "Inc." received because of absence from a quiz or examination may be granted by the head of the department only on receipt of official notice that the absence was authorized or evidence that the cause for the absence prevented making normal preparation to take the quiz or examination before the close of the semester.

When a student resigns or is dropped from the College after the first two weeks of a semester, the Registrar calls for his grades and enters on his permanent record the symbol WP after each course in which he is passing and WF after each course in which he is not making a passing grade. All WF's and F's will be taken into account in determining his grade point ratio thereafter unless for cause the Executive Committee directs otherwise.

The semester grade in a subject which a student is required to drop on account of failure to keep up with the work is F.

## GRADE POINT RATIO

A student's grade point ratio for any period is computed by dividing the total number of semester hours for which he received grades into the total number of grade points earned in that period. Grades of WF and F are included, but grades of WP are excluded.

Only the record made in course work for which the student was registered in this institution is used in determining his grade point ratio.

## GRADE REPORTS

**Preliminary Report:** A preliminary report of the student's progress is sent to the parent or guardian about eight weeks after the beginning of each semester.

**Semester Reports:** At the close of each semester, a report of the student's work during the semester is sent directly to the parent or guardian.

**Unsatisfactory Work:** During the session the deans receive reports from the members of the teaching staff on students doing unsatisfactory work. These reports form the basis for personal conferences with the students concerned and for special notices to parents and guardians.

**Reports to High Schools:** At the close of the first semester, a report is sent to each accredited high school showing the grades made by the freshmen entering the College from that school.

## DISTINGUISHED STUDENTS

A student who completes a semester schedule of at least 15 hours with no grade lower than C and with a grade point ratio of not less than 2.25 for the semester shall be designated as a "Distinguished Student". In official acknowledgment of the designation, he is issued a Distinguished Student card by the dean of his school.

As a recognition of his scholastic achievement, the College allows a Distinguished Student to present his card to the instructor during the next succeeding semester after he distinguishes and, without requirement or privilege of making up the work missed, absent himself from any theory class except for announced quizzes provided, however, that any student who without permission of the instructor leaves a class to which he has reported shall be given a grade of zero for the day's work. This privilege may be revoked for cause at any time by the dean of the student's school.

## HONORARY SCHOLASTIC SOCIETIES

Students ranking near the top of their class scholastically will be considered for admission to one or more of the national honorary societies described below. The honor societies are intended to reward the student of character and ability, and membership in them is a well-recognized mark of distinction which becomes a part of one's permanent record.

**Alpha Zeta.** This is the oldest national agricultural honor fraternity in the country. Election to membership is limited to junior and senior students in agriculture who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Phi Kappa Phi.** Open to all academic fields in the undergraduate school, this honor society elects its membership from those students who are within a year of graduation in a four-year course and are within the top one-tenth of their class scholastically. The student must have been registered one year in the College to be eligible. Graduate students with outstanding records who have satisfied the residence requirement are also eligible for membership.

**Phi Eta Sigma.** Election to this freshman honor society is automatic upon attainment of a grade point ratio of 2.50 or better in all freshman work for one semester or more. The individual must have carried an academic load of at least 13 semester hours and must not have transferred more than 20 hours from another college.

**Phi Zeta.** Students in the School of Veterinary Medicine who rank in the upper ten per cent of the junior class or upper twenty-five per cent of the senior class and who have a grade point ratio of at least 2.25 in their entire veterinary curriculum through the preceding semester are eligible for election to this honor society.

**Sigma XI.** The object of this society is to encourage original investigation in science, pure and applied. It is open to graduate students and to staff members of the A. and M. College System who have shown a marked excellence in one or more departments of pure or applied science and given evidence of an aptitude for scientific research.

**Tau Beta Pi.** Students in the School of Engineering who rank in the top one-eighth of the junior class or top one-tenth of the senior class are eligible for election to this society. This is the oldest national engineering society founded for the purpose of recognizing scholarship.

## SCHOLASTIC PROBATION

Whenever a student's cumulative record indicates that he is failing to make satisfactory progress, he is considered as scholastically deficient. The cause of the deficiency will be investigated by the dean of his school, and the student may be placed on scholastic probation of such terms as the dean shall designate, or he may be required to withdraw from the College if the deficiency warrants.

Scholastic probation is a conditional permission for a student to continue in school after he has become scholastically deficient or after he has incurred an excessive number of unauthorized absences. This permission is granted by the dean of the student's school when an analysis of the deficiency indicates that a continuation is in the best interests of the student and the College.

## CLASSIFICATION

Sophomore, junior, and senior classification will be granted on completion of 30, 60, and 95 semester hours respectively.

## EXCESS HOURS

A student may register for the regular semester program in his curriculum if he is in good standing. With the dean's approval, necessary adjustments for minor irregularities may be authorized up to 20 hours. Registration for 21 hours or more may be approved under the following conditions:

| Hours | Grade Point Ratio Last Semester or Over-all |
|---|---|
| 21 | 1.50 |
| 22 | 2.00 |
| 23 | 2.25 |
| 24 | 2.50 |

The normal amount of work a student may carry in a six-week summer term is 6 semester hours (or 7 if part is practice). Hours in excess of a normal load may be authorized in certain cases by the student's dean in conformance with the limitations that apply during the academic year. For the entire summer session the maximum number permissible is 15 semester hours.

# ADMISSION

## APPLICATION FOR ADMISSION

Any person who desires to apply for admission to the College should write to the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. The applicant should complete the form according to the directions printed thereon and return it to the Admissions Office. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript from each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school training only. It is extremely important that these credentials be submitted in advance of registration. If this cannot be done, the applicant should bring them at the opening of the session. Without the credentials the applicant cannot be admitted, and valuable time will be lost if he has to send for them after arriving at the College.

When admission requirements have been satisfied, the Director of Admissions will then send the applicant a letter of acceptance, a room reservation card, and a physical examination form to be filled out by a physician. The physical examination report must be completed and returned to the Admissions Office prior to the date of registration for classes.

All applicants for admission to the College must be of good moral character, at least sixteen years old, and free from contagious or infectious diseases. Since the Agricultural and Mechanical College of Texas is not a coeducational institution, only men are admitted to the regular session.

A high school student who is eligible for admission to college and who wishes to enter during the summer may well consider the opportunities of combining study and recreation at the Junction Adjunct of the Agricultural and Mechanical College of Texas. Excellent studying, living, and recreational facilities are available at this beautiful Kimble County campsite in the heart of the Texas hill country. Application blanks for admission to the Adjunct may be obtained from the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas.

## BASIC DIVISION

The Basic Division was established to provide for the special needs of entering students and to administer their work during the first year in the College or until they are admitted into one of the degree granting schools. The following groups of students are enrolled in the Basic Division: (1) all acceptable high school graduates entering for the first time upon their college program of studies; (2) all students transferring from other colleges and universities who are not admitted directly to one of the degree granting schools of the College; and (3) all other students who do not meet the requirements for admission to the degree granting school of their choice. These requirements are stated on page 61 of this catalogue.

## METHODS OF ADMISSION

**Of High School Graduates:** An applicant must have graduated from a properly accredited secondary school with a minimum of 15 units (credits) acceptable to the College for entrance purposes. Superior students with unit deficiencies will be considered on the basis of their merit. The applicant who does not meet the above requirement or who falls within the lowest one-fourth of his high school class may be required to make a satisfactory showing on tests prescribed by the College. Generally this means tests given by the College although results of College Entrance Examination Board tests will be acceptable for this purpose.

The 15 acceptable entrance credits shall include four units in English, two units in the social sciences, two units in algebra, one unit in plane geometry, one unit in a natural science, and five acceptable elective units. It is recommended that the five elective units include additional courses from the following subject areas: Foreign languages, mathematics, natural sciences, social sciences, and speech. Applicants for admission to engineering and the natural sciences curricula must present trigonometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Such applicants are also strongly advised to present one-half unit in solid geometry. Three units in English and two units in a foreign language may be substituted for the four units required in English. Applicants are advised to take biology, chemistry, or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

A maximum of three units from the following subject areas may be used as a part of the elective credits:

| SUBJECT | UNITS | SUBJECT | UNITS |
|---|---|---|---|
| Advanced Mathematics | ½ | Drawing | 1 to 3 |
| Agriculture, General | 1 | Distributive Education | 2 |
| Agriculture, Vocational | 1 to 3 | Home & Family Life | ½ to 1 |
| Art | 1 | Home Making | ½ to 1 |
| Business Arithmetic | ½ to 1 | Journalism | 1 |
| Bible | ½ to 1 | Junior Business Training | 1 |
| Bookkeeping | ½ to 1 | Music | 1 |
| Commercial Geography | ½ | Typing | ½ to 1 |
| Commercial Law | ½ | Shopwork | 1 to 3 |

**By Examination:** Any or all of the scholarship requirements for admission may be met by passing the entrance examinations. These will be held at the beginning of each semester under the supervision of the College authorities and will cover all the subjects required or accepted for admission as outlined above. Candidates desiring to take examinations at the College should notify the Director of Admissions well in advance of registration.

**By Individual Approval:** An applicant over twenty-one years of age who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted without examination, subject to the following requirements:

1. He must make application on the official entrance blanks.
2. He must furnish evidence that his preparation is substantially equivalent to that required of other applicants and that he possesses the ability and seriousness of purpose necessary to pursue his studies with profit to himself and to the satisfaction of the College.
3. He must show by a test in composition that he has an adequate command of the English language.
4. The candidate should forward his credentials to the Director of Admissions in advance of his coming, but in no case will he be admitted without a personal interview.

A student admitted by individual approval will not be considered a candidate for a degree until he has satisfied the entrance requirements in full.

**Of Superior Students:** Any superior student, as indicated by his entrance tests and his high school record, who presents evidence of outstanding preparation in any subject matter field may be relieved of the introductory course in that field and permitted to substitute another course with the approval of the dean of his school provided he passes a validating examination in the course with a grade of C or better.

**Of College Transfer Students:** Admission to advanced standing may be granted to an applicant who has satisfied the requirements as outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for each of the last two semesters, or for the total record if less than two semesters of attendance, a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

On the basis of these credentials, credit will be given for work completed with a grade of C or better, so far as the work is equivalent in character and extent to similar work at A. and M. College. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory. Work completed with a grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the subject area.

An applicant whose record does not meet the minimum admission requirements may be considered upon merit after the student has shown satisfactory performance on tests administered at this college.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

College credit for work done in secondary schools will be given only on the basis of examination at the College and shall not include work presented in satisfaction of the entrance requirements.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

**Of Special Students:** A limited number of young men over twenty-one years of age may be admitted to the College as special students, not candidates for a degree, subject to the following regulations:

1. The applicant must show good reason for not taking a regular course and must submit satisfactory evidence that he is prepared to profit by the special studies he wishes to pursue.

2. Record of his previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) his experience; (2) a plan of study, enumerating the courses he desires to pursue; and (3) the purpose or end expected to be accomplished by his study.

3. In order to be admitted to the work of any department, a special student must secure the consent of the head of the department; and his course of study as a whole must be approved by the dean concerned.

Special students are subject to the rules and regulations governing regular students.

A special student who may desire to become a candidate for a degree must satisfy the entrance requirements and obtain the consent of the dean concerned.

**To One of the Degree Granting Schools:** A student may be transferred from the Basic Division to one of the degree granting schools (or into the pre-veterinary medicine curriculum administered by the School of Veterinary Medicine) whenever in the judgment of the Dean of the Basic Division and the Dean of the degree granting school such transfer is in the student's best interest.

Ordinarily, no student will be considered for transfer whose cumulative record shows less than 30 semester hours of credit and 30 grade points earned in two regular semesters, or less than 45 semester hours and 45 grade points in three regular semesters, or (if he is permitted to remain for a fourth semester) less than 60 semester hours with a grade point deficiency in excess of 10 on all hours undertaken in four semesters.

Students who wish to transfer from the Basic Division to the School of Engineering must have earned at least a number of grade points equivalent to the number of credits undertaken and must have at least a C-average in mathematics. In addition, the student may not be transferred while he has an F grade in a course unless he is currently enrolled in the course for the removal of the deficiency.

**Of Nonresident Students:** 1. A limited number of nonresident students who have attended another college or university may be accepted so long as facilities are available. Such students must have maintained a grade point ratio of 1.00 (C-average) or better on all courses undertaken in addition to a grade point ratio of 1.00 (C-average) or better for each of the last two semesters.

2. A limited number of out-of-state high school graduates may be accepted so long as facilities are available. Such students, in addition to satisfying all other admission requirements, must have made superior records in high school.

3. Students who are admitted to the College in one curriculum may not be permitted to change to another which is restricted except under the same conditions as apply to new students.

4. The status of the residence of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. as a student. His residence may not thereafter be changed by him, but, in the case of a minor, it may be changed by his parents, should they move to and become legal residents of the State and maintain such residence for at least one calendar year.

### REGISTRATION

Every student is required to register when he first enters the College and thereafter at the beginning of each semester. Dates of registration for the session of 1960-61 are shown on pages 2-3 of this catalogue.

Registration is not complete until the student pays his fees for the ensuing semester; reports to ROTC headquarters for assignment to an organization; reports to the Chief of Housing for assignment to a room or to report his place of residence if not living in a dormitory; and returns his assignment card, properly approved, to the Registrar's Office, where his receipt showing payment of fees will be stamped "Registered in the Registrar's Office".

## EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students the total cost should range between $800.00 and $1000.00. In general these amounts include four types of expenses as follows: fees payable to the College Fiscal Department (matriculation fee, medical fee, student activities fee, Student Center fee, board, room rent, laundry, and room key deposit); textbooks and supplies; clothing, and military uniform to supplement that furnished by the government; and incidental expenses, estimated to range between $100.00 and $200.00 depending upon the individual concerned.

The total expenses for returning students during a regular session should be somewhat less than those amounts indicated for new students.

The fees for board, room, and laundry listed for the session of 1960-61 may be changed during the year if economic conditions make it absolutely necessary.

Fees payable to the Fiscal Department:

| | First Semester to Begin Sept. 16, 1960 | Second Semester to Begin Feb. 3, 1961 |
|---|---|---|
| Tuition Fee (See Note 4) | $ 50.00* | $ 50.00* |
| Student Services Fee (See page 69) | 18.00 | 18.00 |
| Student Activities Fee (See page 69) | 23.80 | † |
| Property Deposit | 10.00 | |
| Board | 174.00 | 174.00 |
| Room Rent | 67.50 | 60.50 |
| Laundry | 12.85 | 12.95 |
| Room Key Deposit, returnable | 1.00 | |
| Total payable to Fiscal Dept. | $357.15 | $315.45 |
| Textbooks and supplies are variable with classes and courses—about | 40.00 | 30.00 |
| Total general expenses—about | $397.15 | $345.45 |

IN ADDITION TO EXPENSES AS OUTLINED ABOVE, the 56th Legislature further requires the payment of laboratory fees which shall reflect the costs of materials and supplies used and which shall be not less than $2.00 nor more than $8.00 per laboratory course.

All fees except room rent, board, and laundry are payable in full at the beginning of the semester; these fees may be paid in installments as shown below. The last three installments for each semester are due on the dates shown below; the fees for delayed payments shall be $1.00 per day extra for each day of delayed payment of fees for board, room rent, and laundry or for any one of these fees. Students who are delinquent five days will be dropped from the rolls.

All members of the cadet corps living in the dormitories are required to pay the fees for board and laundry in addition to the fees for room rent. Students living in the dormitories who are not members of the cadet corps are required to pay the fees for room rent and laundry in addition to the other required fees. Changes from dormitory student to day student will be made only on the last day of installment payments for room, board, and laundry.

INSTALLMENT PAYING: The general expenses listed above may be paid in installments as follows:

## FIRST SEMESTER

1. First installment, payable on entrance, September 16-17

To Fiscal Department:

| | |
|---|---|
| Tuition Fee (See Note 4) | $ 50.00* |
| Student Services Fee (See page 69) | 18.00 |
| Student Activities Fee (See page 69) | 23.80 |
| Property Deposit | 10.00 |
| Board to October 20 | 52.50 |
| Room Rent to October 20 | 17.50 |
| Laundry to October 20 | 3.75 |
| Room Key Deposit, returnable | 1.00 |
| Total payable to Fiscal Department | $176.55 |
| Textbooks and supplies, variable with classes and courses—about | 40.00 |
| General expenses, first installment—about | $216.55 |

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*The matriculation fee for nonresident students is $200.00 per semester.

†For those students who did not pay the optional fee during the first semester the fee is $11.55.

2. Second installment, payable October 1-20
To Fiscal Department:

| | |
|---|---|
| Board to November 21 | $ 48.00 |
| Room Rent to November 21 | 16.00 |
| Laundry to November 21 | 3.40 |
| Total payable to Fiscal Department | $ 67.40 |

3. Third installment, payable November 1-21
To Fiscal Department:

| | |
|---|---|
| Board to December 17 (Thanksgiving recess excluded) | $ 33.00 |
| Room Rent to December 17 | 13.00 |
| Laundry to December 17 | 2.80 |
| Total payable to Fiscal Department | $ 48.80 |

4. Fourth installment, payable December 1-17
To Fiscal Department:

| | |
|---|---|
| Board to January 28 (Christmas recess excluded) | $ 40.50 |
| Room Rent to January 28 | 21.00 |
| Laundry to January 28 (Christmas recess excluded) | 2.90 |
| Total payable to Fiscal Department | $ 64.40 |
| Total general expenses, first semester | $397.15 |

## SECOND SEMESTER

1. First installment, payable on entrance, February 3-4, 1961
To Fiscal Department:

| | |
|---|---|
| Tuition Fee (See Note 4) | $ 50.00* |
| Student Services Fee (See page 69) | 18.00 |
| Student Activities Fee (See page 69) | † |
| Property Deposit | |
| Board to March 10 | 54.00 |
| Room Rent to March 10 | 18.00 |
| Laundry to March 10 | 3.85 |
| Total payable to Fiscal Department | $143.85 |
| Textbooks and supplies, variable with classes and courses—about | 30.00 |
| General expenses, first installment—about | $173.85 |

2. Second installment, payable March 1-10
To Fiscal Department:

| | |
|---|---|
| Board to April 13 | $ 51.00 |
| Room Rent to April 13 | 17.00 |
| Laundry to April 13 | 3.65 |
| Total payable to Fiscal Department | $ 71.65 |

3. Third installment, payable April 1-13
To Fiscal Department:

| | |
|---|---|
| Board to May 10 (Spring recess excluded) | $ 33.00 |
| Room Rent to May 10 | 13.50 |
| Laundry to May 10 | 2.90 |
| Total payable to Fiscal Department | $ 49.40 |

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*The tuition fee for nonresident students is $200.00 per semester.

†For those students who did not pay the optional fee during the first semester the fee is $12.55.

4. Fourth installment, payable May 1-10
To Fiscal Department:

| | |
|---|---|
| Board to June 3 | $ 36.00 |
| Room Rent to June 3 | 12.00 |
| Laundry to June 3 | 2.55 |
| Total payable to Fiscal Department | $ 50.55 |
| Total general expenses, second semester | $345.45 |

## ADDITIONAL EXPENSES FOR NEW STUDENTS

In addition to the general expenses shown above, new students will have the following expenses when registering for the first time:

| | |
|---|---|
| Uniform (See Note 1.)—about | $ 80.00 |
| Slide rule and drawing instruments for engineering students (See Note 3.) | $38.00 to 53.00 |
| Room key deposit, returnable | 1.00 |
| For new students registering the second semester, | |
| February 3, 1961, extra for books and supplies — about | 10.00 |
| For new students who report for the first semester on September 13 for New Student Program, add: | |
| Board | 5.40 |
| Room Rent | 1.65 |
| Laundry | .45 |

NOTES: 1. Members of the ROTC will be furnished most of their uniform equipment. Cadets will find it necessary to supplement the uniform issued by purchasing the following articles, the approximate cost of which at the College Exchange Store is as follows: one pair of wool elastique O.D. pink trousers ($25.00); two pairs of cotton khaki trousers ($5.95 each); collar ornaments ($2.00); two cotton khaki officer style shirts ($5.45 each); one wool elastique garrison cap ($2.95); one cotton khaki garrison cap ($1.25); and four pairs of black cotton socks ($0.75 per pair). Cadets will pay a handling charge of $8.00 per year to cover the cost of issuing, receiving, and record keeping of Government uniforms issued. Since only approved articles of uniform may be worn, new students should purchase uniforms after arrival at the College.

To defray the cost of additional billing and delayed handling, a charge of ten per cent of the value of uniform articles turned in subsequent to five days following the close of school, with a minimum charge of $1.00, will be made.

The College operates a store for the purpose of supplying necessary articles to students. The store carries in stock textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area. Upon recommendation of the Exchange Store Advisory Board, any profit created from the operation of the Exchange Store may be used for student welfare and other purposes of benefit to the entire student body.

2. The College will furnish the necessary physical education uniform, except shoes, to all students taking required physical education and to others who wish to use facilities of the Physical Education Department. All such students will be required to pay a handling charge of $8.00 per semester for this service. The handling charge includes the cost of laundering the physical education uniform after each use. Each student will be required to furnish his own shoes (1 pair, canvas, rubber sole). These may be purchased at the College Exchange Store for $5.95.

3. The slide rule is one of the most important time-saving instruments of engineers. For use throughout the college course the LL Decitrig Duplex is suggested. Such a rule costs about $22.50. The cost of the drawing instruments needed by engineering students will range from $15.00 to $30.00 depending on quality.

4. For matriculation fee of nonresident students, see paragraph below. Former students who in either semester do not register on the days set apart for that purpose pay an additional tuition fee of $4.00.

5. New students, or former students not in school during the preceding semester, may file room reservation applications beginning June 16 for the first semester; October 16 for the second semester. Each application for a dormitory room reservation must be accompanied by a deposit of $6.00, which will apply on the room rent payable on entrance and for the key deposit. Deposits on room rent for the first semester are not refundable after August 15; for the second semester, after January 15. Application blanks for room reservations will be furnished by the Director of Admissions.

### DAY STUDENTS

Day students pay all specified fees and charges except board, laundry, room rent, and room key deposit.

### GRADUATE STUDENTS

A graduate student, except a full-time staff member, is required to pay the tuition fee and Student Services fee. In the event of registration for the thesis only, he is charged a tuition fee of $15.00.* He also pays the regular charges for laundry and room rent if he resides in a College dormitory. Full-time staff members pay tuition fee only.

### PART-TIME STUDENTS

The tuition fee for students registering for less than 12 credit hours will be reduced by $4.00 for each credit hour less than 12 with a minimum tuition fee of $15.00.

### NONRESIDENT STUDENTS

The residence status of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. College as a student except as provided by law. This policy shall apply to both graduate and undergraduate students regardless of any scholarships, student assistantships, or graduate assistantships that may be granted to any student.

In compliance with the State law, the tuition fee for nonresident students is $200.00 per semester. A nonresident student is hereby defined to be a student of less than twenty-one years of age, living away from his family and whose family resides in another state, or whose family has not resided in Texas for the twelve months immediately preceding the date of registration; or a student of twenty-one years of age or over who resides out of the State or who has not been a resident of the State twelve months subsequent to his twenty-first birthday or for the twelve months immediately preceding the date of registration. The tuition fee for nonresident students registering for less than 12 credit hours will be reduced by $16.00 for each credit hour less than 12.

The term "residence" as used herein means "domicile" and the term "resided in" means "domiciled in."

The legal residence of one who is under twenty-one years of age is that of the father. Upon death of the father, the legal residence of the minor is that of the mother. Upon divorce of the parents, the residence of the minor is determined by the legal residence of the person to whom custody is granted by the court. In the absence of any grant of custody, the residence of the father continues to control. Upon death of both parents, the legal residence of the minor continues to be that of the last surviving parent until he becomes twenty-one unless he makes his home with his grandparents, whereupon their residence is controlling.

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*The tuition fee for thesis only for a nonresident student is $17.50.

Individuals who have come from without the state of Texas and who register in an educational institution of the State prior to having resided in the State for a period of twelve months shall be classified as nonresident students; and such nonresident student classification shall be presumed to be correct as long as the residence of such individuals in the State is during their attendance at educational institutions, regardless of whether such individuals have become qualified voters, have registered motor vehicles and paid personal property taxes thereon, have obtained Texas drivers' licenses, or have otherwise attempted to establish legal residence within the State.

A student under twenty-one years of age shall not be classified as a resident student until his parents shall have maintained legal residence ("domicile") in this state for at least twelve months. A student under twenty-one years of age whose parents leave the State to reside in another state normally shall be classified immediately as a nonresident student. It shall be the responsibility and duty of the student to submit legal evidence of any change of residence.

Individuals of twenty-one years of age or less whose families have not resided in Texas for the twelve months immediately preceding the date of registration shall be classified as nonresident students regardless of whether such individuals have become the legal wards of residents of Texas or have been adopted by residents of Texas while such individuals are attending educational institutions in Texas or within a year prior to such an attendance or under circumstances indicating that such guardianship or adoption was for the purpose of obtaining status as a resident student.

All individuals who have come from without the state of Texas and who are within the State primarily for educational purposes are classified as nonresidents. Registration in an educational institution in the State is evidence that residence is primarily for educational purposes even though such individuals may have become qualified voters, have become legal wards of residents of Texas, have been adopted by residents of Texas, or have otherwise attempted to establish legal residence within the State.

A student twenty-one years of age or older who comes from without the State and desires to establish a status as a resident student must have resided in the State as a legal resident for a period of at least twelve months and must have the intention of establishing a permanent residence within the State during that entire period.

All aliens shall be classified as nonresident students except that an alien who has applied for naturalization in the United States and has received his first citizenship papers shall have the same privilege of qualifying as a resident student as a citizen of the United States. The twelve months' residence required to establish the status of a resident student shall not begin until after such first citizenship papers have been received by the alien.

Officers, enlisted personnel, selectees or draftees of Army, Army Reserve, National Guard, Air Force, Air Force Reserve, Navy, Naval Reserve, or the Marine Corps of the United States who are stationed in Texas by assignment to duty within the borders of this state, shall be permitted to enroll themselves, their husband or wife as the case may be, and their children by paying the tuition fees and other fees or charges provided for regular residents of the state of Texas, without regard to the length of time such officers, enlisted personnel, selectees, or draftees have been stationed on active duty within the State. This provision shall extend only during active military service in Texas; and upon such member of the Armed Services being transferred outside the state of Texas, he and his children shall be classified as to residence under the second paragraph of these regulations. Any student claiming the privilege of this section shall submit at each registration a statement by the commanding officer of the post or station at which he or his parents is on active duty verifying the fact of his or his parent's military status.

The residence of a wife is that of her husband; therefore a woman resident of Texas who marries a nonresident shall be classified as a nonresident and shall pay the nonresident fee for registrations subsequent to her marriage. A nonresident woman student who marries a resident of Texas is entitled to be classified immediately as a resident student and is entitled to pay the resident fee for all subsequent registrations.

Appointment as a member of the teaching or research staffs or the holding of a fellowship, scholarship, or assistantship shall not affect a student's residence status or the tuition fee to be paid.

It shall be the responsibility of the student to pay the correct fee at the beginning of each semester or term for which he may register, and a penalty of $10.00 shall be assessed for failure to pay the proper fee.

The responsibility of registering under the proper residence is placed upon the student, and it is his duty, at or before registration, if there is any possible question of his right to legal residence in Texas under the State law and these regulations, to raise the question with the proper admissions officer and have such question settled prior to registration. Change in residence classification shall be only by the proper admissions officer.

## PAYMENTS

Payments to the Fiscal Department should be made by cashier's check or money order, payable to the Agricultural and Mechanical College of Texas. All checks, money orders, and drafts are accepted subject to final payment. Personal checks will not be accepted.

## REFUNDS

Any student withdrawing officially (a) during the first week of class work in a semester will receive a refund of four-fifths of the tuition fee; (b) during the second week of class work, three-fifths; (c) during the third week of class work, two-fifths; (d) during the fourth week of class work, one-fifth; (e) after the fourth week of class work, nothing. No refunds will be made until ten days have elapsed from the time the fees were paid.

Students withdrawing from a laboratory course during the first week of class work in a semester will receive a refund of 100% of the laboratory fee paid. Students withdrawing from a laboratory course after the first week of class work in a semester shall not be entitled to a refund.

A refund of board and laundry payment will not be made unless there is a consecutive absence of not less than ten days due to illness of the student or a member of his family, or for some other unavoidable cause.

Students withdrawing during the first week of the Fall Semester will receive a 100% refund of the Student Activities fee. Students withdrawing after the first week of the Fall Semester and before the end of the first week of the Spring Semester, will receive a refund of $6.55 and will be entitled to receive a copy of the student annual. Students withdrawing after the first week of the Spring Semester will receive no refund.

Students not enrolled in the first semester and withdrawing during the first week of the Spring Semester will receive a 100% refund of the Student Activities fee. No refund will be made to students withdrawing after the first week, but the student will be entitled to receive a copy of the student annual.

## DEDUCTIONS

No deductions will be made from charges for board, laundry, and room rent in case of entrance within ten days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten days of a semester or the last ten days for which payment is made.

## UNPAID CHECKS

If a check or draft accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of $1.00.

## DUPLICATE RECEIPTS

Duplicate receipts covering fees paid by students will be issued on payment of twenty-five cents.

## TUITION FEE

The tuition fee, fixed by the State law, includes the cost of necessary classroom supplies and entitles the student to the usual college privileges, including the use of the library.

## AUDITING OR VISITING FEE

The fees for courses audited or visited by students shall be the same as for courses for which credit is given.

## STUDENT SERVICES FEE

The student services fee covers the professional services of the College physician and the hospital staff. Surgical operations and charges for consultations with outside physicians requested by parents are not included.

The student program activities of the Memorial Student Center as well as other services are supported in part by this fee.

## ROOM RENT FEE

Rooms are furnished with single bedsteads, mattresses, tables and chairs, and running water. The charge for room rent also includes heat, light, and cleaning the corridors but not the rooms.

## STUDENT ACTIVITIES FEE

The optional student activities fee includes subscription to the Battalion newspaper, the College annual, and the magazine of the student's particular school as well as admission to the Town Hall program, the Great Issues and Recital Series, and to all athletic events held at College Station under the auspices of the Athletic Department.

## VOCATIONAL REHABILITATION AID

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and required fees to students in Texas colleges who have certain physical disabilities, provided the vocational objective selected by the student has been approved by a representative of the Division.

Assistance for this phase of the program of vocational rehabilitation is based on physical disabilities resulting in a vocational handicap and on the financial need of the individual concerned.

Application for Vocational Rehabilitation should be made to the Division of Vocational Rehabilitation, Room 505, Varisco Building, Bryan, Texas, or to J. J. Brown, Director, Division of Vocational Rehabilitation, Capitol Station, Austin, Texas.

# STUDENT LIFE

## LEADERSHIP AND GUIDANCE

Leadership and guidance in the area of student life are the responsibilities of the Dean of Students. Responsibility for the enforcement of College regulations lies with the Director of Student Affairs for civilian students and with the Commandant of Cadets for military students. Appeals by civilians may be made to the Director of Student Affairs and by military students to the Commandant.

The student government of the College is carried out through the Student Senate. The office of the advisor of the Student Senate and the files for the organization are in the Directorate Office, west end, ground floor of the Memorial Student Center.

The Civilian Council serves as the official governing body for civilian students, with responsibility in those areas affecting civilian students only. The Council is advised by the Department of Student Affairs.

## BASIC POLICY

The rules of conduct by which every student is expected to live while attending the A. and M. College of Texas are contained in the Basic Policy, a copy of which follows:

The Board of Directors finds it necessary to assert the basic principles to govern student life and staff-student relationship at the A. and M. College of Texas.

The College accepts responsibility for the curricular work of the student and for his conduct and development. The term "College" as used here embraces the Board of Directors, the President, the faculty, all personnel of the A. and M. system, the student body, former students, and all the worthy traditions of the institution.

Every student is expected at all times to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of his time toward an education.

Every student has rights which are to be respected. They include the right of respect for personal feelings, the right of freedom from indignity of any type, the right of freedom from control by any person except as may be in accord with published rules and regulations of the College, and the right to make the best use of his time and his talents toward the objective which brought him to this institution. No officer or student, regardless of position or rank, shall violate those rights. No custom or regulation in conflict will be allowed to prevail.

It shall be the duty of every person employed by this institution to conform to this policy; to cooperate with all agencies of the College and with the student body, individually and collectively, in carrying out its provisions. Personal responsibility in this respect will be primary.

## THE OFFICE OF THE DEAN OF STUDENTS

Responsibility for the development and welfare of the student in areas other than academic is placed with the Office of the Dean of Students. Activities are provided which help to meet the physical, emotional, social, and spiritual needs of students.

Student personnel departments and offices under the direction of the Dean of Students include the following:

Commandant (Headquarters of the Corps of Cadets)
Army ROTC

Air Force ROTC
Student Affairs, Veterans, Advisory Service, Foreign Student Advisor, Campus Security, Housing and Civilian Counselors
Memorial Student Center
Placement of Graduates, Student Labor and Loan, Short Courses
Student Health Services
Y.M.C.A. and the All Faiths Chapel

## STUDENT AFFAIRS

The Department of Student Affairs includes the activities and functions of the Veterans Advisor's Office, the Housing Office, Civilian Dormitory Counselors, the Foreign Student Advisor's Office, and the Campus Security Office.

## VETERANS ADVISORY SERVICE

The A. and M. College of Texas provides a Veterans Advisor to assist ex-servicemen with their problems. This office is located on the ground floor of the YMCA Building.

## HOUSING AND MEALS

**Single Students:** Unless they are living with their families, all students are required to live in College-owned dormitories on the campus. Dormitories are designd especially to meet the student's needs of living and study.

Reservations are filed in the order in which they are received and will be held only until 3 p.m. of the regular registration day. Reservations made by students who do not complete their registration on the regular registration day by 5 p.m. may be cancelled, and the space will be assigned to another applicant.

New students may file room reservations as soon as they have been accepted by the Director of Admissions and Registrar. As soon as a new student has been accepted for admission, he will be mailed a room reservation request card, which should be filled out as directed and returned to the Fiscal Office with a check or money order for $6.00 for room reservation fee and key deposit. As soon as the reservation has been made, the student will be notified of his assignment to dormitory space. The room reservation fee will be credited to the student as part of his room rent payment upon his registration in June, September, or February. Should a student decide that it will be impossible for him to register, he may have his reservation cancelled, provided he notifies the Housing Office prior to the regular registration day of the semester for which the reservation has been made. In such cases the room reservation fee may be returned. Cancellations made after the regular registration day indicated above will result in a forfeit of the reservation fee. The room assignment card and room reservation fee receipt will be secured at the Housing Office, Ground Floor, YMCA Building, when the student reports for registration.

All cadets residing on the campus are required to take their meals in one of the two dining halls on the campus, operated by the Subsistence Department of the Business Office. Each has a seating capacity of 4,000 and furnishes the students at cost well-balanced meals prepared under the direction of experienced supervisors.

Those students who are not members of the Cadet Corps may also eat their meals in the College dining hall. They, however, may take their meals elsewhere if they so desire.

**Married Students:** The College operates 778 apartments for married students, with first priority given to ex-servicemen. More complete information about these apartments and application forms for them may be obtained from the Housing Office, Ground Floor, YMCA Building.

## FOREIGN STUDENT ADVISOR

The Office of the Foreign Student Advisor is located in Room 105, Bizzell Hall. Information relative to immigration regulations and assistance with problems peculiar to students from other lands may be obtained from this staff member.

## REGISTRATION OF MOTOR VEHICLES

All students and employees who drive motor vehicles on the campus must have them registered in the Office of Campus Security, Ground Floor, YMCA Building, within 48 hours of the time that they are brought on the campus.

Students are assigned parking areas according to their housing assignment. Cars must be parked in these designated areas during the regular classroom hours.

## MEMORIAL STUDENT CENTER STUDENT ACTIVITIES

Dedicated to the memory of the men of the Agricultural and Mechanical College of Texas who gave their lives during World Wars I and II, the Memorial Student Center was erected to foster the social, cultural, and spiritual phases of student life.

General facilities of the Memorial Student Center include a dining room, snack bar, gift shop, telephone and telegraph center, barber shop, 66 guest rooms, travel agency, check cashing and information center, and United States Post Office. Recreational facilities include bowling alleys, table tennis area, game room, browsing library, and record playing rooms. A large number of meetings, receptions, exhibits and social affairs given by the student and staff organizations of the College are held at the Center.

Included in a special activities program of the Memorial Student Center Directorate are the following special interest committees: Creative Arts, Music, Dance, Radio, Camera, Browsing Library, Film Society, Recital Series, Great Issues, Flying Kadets, Bowling, Table Tennis, Chess, Bridge, Public Relations, Personnel, Evaluation, and the Student Conference on National Affairs. These activities are governed by the Memorial Student Center Council, composed of eight students, five faculty members and two former students, with a student as president of the Council. The Directorate, which is composd of the various committees, plans and directs the entire program. Many positions of leadership are open in this student program for those who join the committee activities at an early date.

The Memorial Student Center is charged with counseling and fiscal operation of many student activities. It sponsors such activities as recreation and entertainment on the campus, including the campus movie program, music and drama activities, social activities, clubs, student government, and other co-curricular activities.

**Clubs:** Many opportunities exist for students interested in co-curricular club activities. There are more than 150 organizations on the campus, ranging in interest from hometown clubs to technical societies. Their activities include discussion meetings, movies, smokers, barbecues, dances, and inspection trips.

**Dances and Social Affairs:** Social life at the Agricultural and Mechanical College of Texas is highlighted by numerous dances and social functions. The various classes, military units, and civilian organizations sponsor dances. In addition, certain all-school social functions are held for which outstanding name bands provide music. The most elaborate function is the traditional Senior Ring Dance and Banquet, when graduating seniors and their guests dance to an outstanding orchestra of the year. All parties and other social functions, whether held on or off the campus, must be approved by the College.

**Town Hall:** The Town Hall program includes the best obtainable artists in the fields of music and entertainment. Since its inception, the Town Hall roster has boasted such names as Bob Hope, Doris Day, Oscar Levant, Marge and

Gower Champion, the Ballet Russe de Monte Carlo, the Four Freshmen, the Kingston Trio, the Houston Symphony, the Boston Pops Orchestra, several Broadway musicals, and many other famous entertainment features. Activity fees and the sale of season and individual tickets make it possible to bring these outstanding programs to the student body at low prices.

## DRAMA AND SPEECH ACTIVITIES

**The Aggie Players:** This is a student organization that offers active participation in theater work for college credit or as extracurricular activity. It is part of the Memorial Student Center program and presents three to five major dramatic productions a year. Any student is invited to join.

**Debate Activities:** The Aggie Discussion and Debate Club is sponsored jointly by Student Activities and the Department of English. Activities include the annual A. and M. debate tournament, six other tournaments, poetry reading, extemporaneous speaking, and oratory. Interested students should contact the Department of English.

**Singing Cadets:** This widely known singing unit consists of more than 60 students. The group has appeared in many Texas cities and in Mexico, on numerous broadcasts and telecasts, and on various other entertainment programs. Membership is selected from the entire student body by auditions held early in the fall semester.

**Aggieland Orchestra:** The Aggieland Orchestra is a College-sponsored dance band. Each year the organization plays for numerous dances and shows on the campus. Tours are taken to different parts of the state to play for A. and M. Club dances. Members are chosen in the fall of the year. Rehearsals are held each week in the Music Hall.

**Music Hall:** For students interested in music, a building with practice rooms and pianos is provided. The Music Hall also contains a library of vocal, piano, and other instrumental literature which can be checked out by students. It is open for use from 8 a.m. until 5 p.m., but may be used by special permission at night for instrumental or vocal groups.

**Guion Hall Theater:** The Guion Hall Theater is operated daily to provide economical and convenient movie entertainment for the student body and College staff. Although good pictures are shown, they are usually second-run shows in order to keep costs as low as possible. Continuous evening filmings are shown while school is in session.

**The Grove:** The Grove is an outdoor concrete recreational area with a stage, utilized by the Memorial Student Center for the scheduling of movies, intramural athletics, concerts, dances, picnics, games, and festivals. In the fall the Grove is the scene of the famous Texas Aggie yell practices.

The Memorial Student Center Building Cashier provides banking service for the numerous student organizations on the campus and in the Memorial Student Center. The Cashier's window is also headquarters for the sale of season and individual tickets for various campus presentations, including Great Issues, Recital Series, and Town Hall.

## COLLEGE HEALTH SERVICES

The College Hospital has been remodeled recently to give more efficient service. Besides infirmary space for over 100 patients, the facilities now include a complete physiotherapy department as well as new laboratory and X-ray departments. The medical staff includes specialists in the field of medicine, surgery, radiology, and ear, nose, and throat.

The Clinic is open from 8 a.m. to 5 p.m. on weekdays and from 8 a.m. to 12 noon on Saturdays. The student services fee provides for clinic visits, diagnostic examinations, care for acute illness, emergency care for accidents, and 10 days of infirmary care each semester in cases requiring hospitalization. Routine medications for acute illnesses, X-rays, laboratory tests, and local ambulance service are also furnished the student without charge. A staff of Registered Nurses is on duty, with a staff physician on call, to care for emergency cases at any hour.

The water of the College is supplied through a College-owned water supply system and comes from four deep wells located nine miles northwest of the College campus. As a part of the sanitary work carried on throughout the entire year, the College laboratories make bacteriological checks of this water supply and of the milk supply at regular intervals.

The College is particularly concerned with the maintenance of the health and physical development of its students. It provides one of the finest indoor swimming pools in the State, as well as tennis courts, a golf course, athletic fields, and physical training.

## RELIGIOUS ACTIVITIES

The A. and M. College of Texas is non-sectarian, but its high objectives cannot be achieved unless its educational program is founded on a solid religious life. Divorced from the spiritual aspirations of the individual and of the group, education cannot be complete. The basic purpose of education is a normal religious life to the end that young people may be not only more efficient but better motivated by a sense of duty and obligation. Thus, in an atmosphere of tolerance and mutual respect, every student is encouraged to maintain his ties with the religious group to which such association may be made most fruitful.

**Young Men's Christian Association:** The YMCA endeavors to develop the full, rounded man by emphasizing growth in mind, body, and spirit. Because of the effect of the YMCA on the lives of many students, it holds a coveted spot in the hearts of Aggies.

The varied and vigorous program of the YMCA depends on student participation, initiative, and leadership. The program is centered around stimulating the moral and spiritual lives of the students and includes religious discussions, Bible study, conferences, intercollegiate visits, steak fries, leadership development, Freshman Camp, Religious Emphasis Week, United Nations Club, Preparation for Successful Marriage Forums, and many other worthwhile projects.

**All Faiths Chapel:** The beautiful new All Faiths Chapel, a gift of the Former Students, is made of Austin limestone and glass, and is modern in design.

In addition to encouraging individual meditation and prayer and serving as a meeting place for small religious groups, the other activities foreseen include making available a library of religious books, a secluded meditation room, accommodations for small weddings, funerals, memorial services, baptisms, vesper services, and other religious rites. The Chapel is open at all hours for meditation and prayer.

**Religious Services:** In addition to the college religious life staff, there are nine churches near the campus whose primary purpose is to serve the spiritual needs of the students. The campus religious leadership is deeply conscious that the students are in perhaps the most formative period of their lives and feel keenly the responsibility for their spiritual development.

The programs of the respective churches are aimed primarily to meet the student needs. Many of the churches have distinct student departments with specialized leadership whose sole responsibility is that of ministering to the students. The pastors of the churches also give as much time as is necessary to the students for personal counseling.

The churches serving the campus have a program similar to that of the home church with an expanded young people's department and dominant emphasis upon student interests. In addition to the special student emphasis, they have the customary Sunday worship periods, church schools, and young people's organizations promoted to stimulate clear and constructive thinking in the important field of religion. The student departments are expanded to offer wholesome recreation and social life and social service.

**Religious Emphasis Week:** One week during each year is designated officially by the College administration as Religious Emphasis Week, in which the entire College cooperates, making it possible to have an outstanding religious leader to address voluntary convocations of the students. The administration of the College, knowing the value of developing the spiritual aspects of the personality of the students, authorizes an adjustment of the College program so as to permit all students to attend.

**Courses in Religious Education:** The Baptist General Convention of Texas; the Church of Christ; the Board of Missions of the Episcopal Church, Diocese of Texas; the B'nai B'rith Hillel Foundation; the Division of Student Service, the National Lutheran Council; the Texas Methodist Student Movement; the Presbyterian Church, U.S. and U.S.A.; and the Roman Catholic Church, Diocese of Austin, upon approval of their respective boards, have been authorized to offer courses in religious education open to students of junior and senior classification.

A maximum of six semester hours from the following courses in religious education may be applied toward a degree from the college:

**305. Old Testament Character Studies. (1-0). Credit 1.**
Through a chronological study of many characters in the Old Testament, the student becomes acquainted with experiences in the lives of these characters, through which is revealed the righteous and omnipotent God of the Old Testament.

**306. New Testament Character Studies. (1-0). Credit 1.**
After a brief introduction to the New Testament giving the political, social, moral and religious situation at the time of Jesus' birth, the course will pursue a character study of key personalities in the New Testament and their contribution to the Christian system of thought.

**309. Early Old Testament History. (1-0). Credit 1.**
Story of Bible history as recorded in first five books; study divided into five periods between the Creation and the Wilderness wanderings.

**310. Later Old Testament History. (2-0). Credit 2.**
Periods of Bible history studied include: conquest of Canaan, the Judges, the united Kingdom, the divided Kingdom, Judah alone, the exile, and return from exile.

**311. The Synoptic Gospels. (2-0). Credit 2.**
A study of the first three Gospels, Matthew, Mark and Luke, with emphasis upon the contribution of each to our knowledge of the life and teachings of Jesus.

**312. The Gospel of John. (1-0). Credit 1.**
This course is a detailed study of the life and teachings of Jesus as reported in the fourth Gospel. Special attention is given to interpretation of Jewish customs and institutions for the non-Jewish (Greek) readers.

**313. Survey of the New Testament. (2-0). Credit 2.**
Each book of the New Testament is studied with reference to its author, purpose, content, unique characteristics, and the historical background which provided the occasion for its writing.

**314. Survey of the Old Testament. (3-0). Credit 3.**
Each book of the Old Testament is studied in light of the historical background of the Hebrew people and the development of their relationship with God.

**318. The Book of Acts. (1-0). Credit 1.**
Chapter by chapter study of Acts; founding and spread of church in Jerusalem, Judea, Samaria; Paul's travels; church among the Gentiles.

**319. The Epistles of Paul. (2-0). Credit 2.**
A study of the life and thought of Paul as found in the Book of Acts and Pauline correspondence. A history of the primitive church as reflected in these writings.

**320. The Book of Revelation. (1-0). Credit 1.**
This book is studied in the light of the persecution of Christians in the Roman Empire, and as an apocalyptic writing to serve in strengthening their faith in and loyalty to Christ and to his teaching.

**321. The General Epistles. (1-0). Credit 1.**
A study of the "open letters" written by James, John, Peter, and Jude to the early Christian churches, comparing their messages with the recorded words of Jesus relative to the situation and problems of their day and ours.

**323. The Life of Jesus. (3-0). Credit 3.**
In this course, the four Gospels are studied with the passages in the four books arranged in chronological sequence so as to give a connected account of the life of Christ and to reveal similarities and differences in the four books.

**324. The Prophetic Movement in the Old Testament. (3-0). Credit 3.**
A history of the prophetic movement from the 8th century B.C. to the time of the Maccabees. An interesting study of the contribution of the prophets to the religious thinking of the day, and the permanent value of their teachings.

**325. The Book of Job. (2-0). Credit 2.**
The book of Job is one of the great books of all time. It offers in interesting form a thorough study of the problem of suffering.

**326. The Psalms. (2-0). Credit 2.**
This study of the book of Psalms includes a glance at Hebrew poetry, at the source and background of certain of the Psalms, and a study of their beauty of structure and composition and of their interpretation.

**327. An Introduction to the Bible. (2-0). Credit 2.**
A course to acquaint the student with the Bible showing its unity and the continuity existing between the Old and New Testaments by a study of representative sections of both Testaments together with their historical settings and their relationship to each other.

**329. Proverbs. (1-0). Credit 1.**
This study of the book of Proverbs includes authorship, date of wrting, and a close study of the practical wisdom contained in the proverbs, of which the book is full.

**330. Ecclesiastes and the Song of Solomon. (1-0). Credit 1.**
A study of two neglected books of the Bible—their contents, interpretation and significance.

**335. Comparative Religions. (2-0). Credit 2.**
A study of the most popular contemporary religions of the world as channels through which men have tried to find the meaning of life and to relate themselves to its values. It includes Buddhism, Confucianism, Mohammedanism, Judaism, and Christianity.

## CORPS ACTIVITIES

The aim of the Corps of Cadets is to offer a sound collegiate education in both mind and body under strictly military discipline. The method of administration of this military discipline and its extension to all phases of the cadet's non-academic life are distinctive at the Agricultural and Mechanical College of Texas. Students are organized along military lines and observe military practices at all times. They habitually wear the prescribed uniform and live in rooms assigned to them on the basis of their military organization. From reveille to taps, every hour of the cadet's time is accounted for. The regular habits of study and living thus formed, the attention to duty, obedience to authority, and love for order inculcated are considered among the most valuable features of the military education. While some of the graduates enter the military profession, hundreds in all walks of civil life attest to the high value of the training received at this institution.

An integral part of the military system is the requirement of freshmen of certain extra duties and activities at the beginning of their college career. During the early weeks of their first year the cadets have special drills under their cadet officers and follow a rigorous program of behavior designed to improve their military posture and to inculcate early respect for upperclassmen who are their military superiors. These special activities do not interfere unduly with the freshman's academic program nor usurp his prerogatives as a private individual. They are supervised by responsible cadet officers under the general supervision of the Commandant and are to be distingushed from irresponsible hazing which is forbidden by the rules and regulations of the College.

In keeping with the democratic ideals of the Agricultural and Mechanical College of Texas the formation of exclusive societies or fraternities, membership in which is based on other requirements than individual worth and achievement, is forbidden. When new cadets report to the college, all are at once put in uniform and, as far as possible, all artificial distinctions based on wealth, position, or influence are minimized and the cadet is encouraged to achieve his place by individual merit. All cadets live under practically identical conditions, and all are rated by the same standards, but there is a wide range of opportunity for each to develop in accordance with his needs and aptitudes.

Among Cadet Corps organizations is the Ross Volunteer Company, a military group composed of outstanding cadets. This unit was organized in 1887 by Colonel T. M. Scott, business manager of the College, for the purpose of banding together the most proficient military men in A. and M. College into a precision drill team. They were first called the Scott Volunteers. The name was changed to Ross Volunteers in 1891 to honor Governor Lawrence Sullivan Ross, who in that year became President of the College. It was originally the plan of the organization to change its name in honor of each succeeding president of the College, but in 1902, at President Harrington's request, the idea was dropped and the name Ross Volunteers made permanent.

There are several important cadet organizations that do not come under a specific classification. The following should be mentioned as having distinctive functions in cadet life: the Aggie Band, the largest college military band in the United States; the Rifle and Pistol Teams, which compete in national matches; and the Freshman Drill Team, a precision military drill team.

## STUDENT PUBLICATIONS

The College provides unusual opportunity for students to participate in student publications. An Office of Student Publications, headed by the Director, works within the framework of policy established by the Board of Student Publications.

The Office of Student Publications, together with editorial offices, is located on the Ground Floor of the YMCA Building.

The following seven journals and papers are published:

**The Battalion:** The Battalion is the student newspaper edited and produced by Texas A. and M. students. It is also the official newspaper of the City of College Station. Students who begin work as freshmen or sophomores may become paid employees in editorial capacities during their junior and senior years.

**The Aggieland:** The yearbook of the student body is known as The Aggieland. Many opportunities for participation are available because of the amount of work necessary to produce a complete record of the school year.

**Student Directory:** Each year the Office of Student Publications publishes an official directory of offices, staff personnel, and students for the College.

**The Engineer:** Published six times annually by students in the School of Engineering, this journal is designed to inform and to promote talent for technical writing. Students who have ability in research, in reporting scientific data, or in creative writing, are welcome as members of the staff.

**The Agriculturist:** Students of the School of Agriculture produce The Agriculturist, a quarterly publication printing research, scientific, and technical articles relating to the field of agriculture.

**The Southwestern Veterinarian:** The leading college veterinary magazine in the country, as well as in foreign countries, this publication is produced quarterly by the students of the School of Veterinary Medicine.

**The Texas A. and M. Review:** Students of the School of Arts and Sciences publish The Texas A. and M. Review, a campus-wide magazine of general interest, four times each year.

## THE TEXAS AGGIE BAND

The Texas Aggie Band is the official band of the A. and M. College. It is often referred to as the "pulse of the Spirit of Aggieland" and furnishes music for military ceremonies, yell practices, and athletic events.

Interested new students should indicate on the advanced room reservation card their desire to participate. No try-outs are necessary. Although a large number of College-owned and government-owned instruments are available for issue, it is advised that students having their own instruments bring them.

## INTRAMURAL ATHLETICS

Intramural athletics feature contests between military units and between civilian organizations. The intramural program, which is one of the most outstanding in the country, includes flag football, softball, volleyball, handball, basketball, track, swimming and diving, wrestling, bowling, horseshoes, rifle shooting, golf, cross country, tennis, and table tennis. Ample physical facilities are available to accommodate these comprehensive intramural activities.

## INTERCOLLEGIATE ATHLETICS

The A. and M. College of Texas is a member of the Southwest Athletic Conference, which embraces eight leading major colleges and universities—The University of Texas, the Agricultural and Mechanical College of Texas, Baylor University, the Rice Institute, Texas Christian University, Southern Methodist University, the University of Arkansas, and Texas Technological College. The intercollegiate program includes football, baseball, basketball, track, cross country, swimming, tennis, and golf. Varsity teams in each sport are known as the Texas Aggies, and the uniforms used by the players are in the school's colors, maroon and white.

Center of athletics is Kyle Field, which contains the football stadium seating 33,000 in the old stands, 2,460 in the new addition to the west stands, and with temporary bleachers and cinder path boxes giving a total capacity of 41,594. A quarter-mile cinder track with a 220-yard straight-away and a baseball diamond with 4,000 seats afford excellent facilities for these sports. The P. L. Downs, Jr., Natatorium with swimming pool 100 by 60 feet, has lockers and showers, and seats for 600 spectators. DeWare Field House has been converted from a 3,500-seat basketball gymnasium into a Physical Education Plant, while the new G. Rollie White Coliseum seating 8,500 is available for basketball and other indoor College events. In addition there is an auxiliary gymnasium with handball courts and large rooms for physical education classes. An 18-hole golf course is available to students on the campus.

## OFFICE OF PLACEMENT AND SPECIAL SERVICES

### Employment for Graduates

The College feels a definite responsibility for the proper professional placement of its graduates. Assistance in fulfilling this responsibility is shared jointly by the faculty and the Office of Placement and Special Services. The function of this office is to maintain active contact with prospective employers of the graduating students and alumni in such manner that well qualified men may be directed to suitable job opportunities.

Supplementing assistance in securing professional employment, this office cooperates with other College departments in an educational program designed to acquaint undergraduates with opportunities in the fields of work in which they are interested, and to advise on problems which will be met in entering professional employment. Assistance is given students in preparing credentials for submission to employers as well as advice on the proper approach in seeking a job. Assistance is also given undergraduates in securing employment during the summer vacation.

Seniors and graduate students who wish to make use of these services are requested to file a record of their qualifications with the Placement and Special Services Office early in the year in which their college work will be completed. There is no charge for this service other than for personal leaflets, which are prepared at cost on request.

### Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Every effort is made to develop new employment opportunities outside of the College. To become eligible for employment, a student must have been admitted to the College by the Director of Admissions and have an accepted application on file with the Office of Student Labor and Loans. Continued eligibility for employment is contingent on satisfactory performance of work and on the ability of the student to maintain good scholastic standing.

Ordinarily only those students whose financial resources are limited may be considered for employment. Assignments are made primarily on the basis of need and sincerity of purpose.

### Loan Funds

The Association of Former Students administers a series of loan funds which are available to any student who has been in the College at least three semesters, and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available. Information about such may be secured from the Head of the Office of Student Labor and Loans. Included in such funds are the Lucy Jane Breazeale Loan Fund, the Ernestine Gaber Loan Fund, the Davis Buck Fund, the Allsup-Ramsey Loan Fund, the George Long Memorial Fund, the James Leftwich Shepherd Fund, the Sonora A. and M. Mothers' Club Fund, the A. and M. College Loan Fund, and the Jitterbug Henderson Memorial Loan Fund. Students desiring National Defense Student Loans should apply at this office.

### Special Services

Special services of the Office of Placement and Special Services include the administration of the Short Courses program.

# SCHOLARSHIPS, FELLOWSHIPS, AND AWARDS

The scholarship program is administered by a permanent committee known as the Faculty Committee on Scholarships. As authorized by the Board of Directors, this committee is composed of the Dean of the College, who serves as chairman; Secretary of the Former Students Association; and representatives, appointed by the President, as follows: one from the Basic Division and one from each of the undergraduate schools of the College.

In general there are three types of scholarships available: (1) Valedictory Scholarships and Opportunity Awards, representing those limited to entering freshmen; (2) scholarships designed for the more advanced undergraduate students; and (3) fellowships and grants-in-aid for graduate students.

The over-all program is designed to encourage and reward scholastic effort on the part of all students to enable outstanding students to do the best work of which they are capable by removing financial handicaps and to enable capable and ambitious young men who might be denied a college education for financial reasons only to secure that education at the Agricultural and Mechanical College of Texas.

### Valedictory Scholarships

The College offers a scholarship to the valedictorian or honor graduate, if a boy, of an accredited secondary school of Texas that holds at least fifteen units accredited by the Texas Education Agency. The successful applicant must make the highest record among all students, boys and girls, graduating that calendar year including winter, spring, and summer graduating classes, and must be certified through the Texas Education Agency. The scholarship is valid during each semester of the first long session after the holder's graduation from high school. The financial benefit is exemption from the tuition fee, the student services fee, and laboratory fees for courses in which the student may enroll. The scholarship is not valid for the second semester unless the student has passed at least ten semester hours for the first semester with an average grade of C or better.

### The Opportunity Award Program

This program annually provides approximately 100 four-year scholarships to high school graduates of Texas who are capable of outstanding scholastic achievement and who need financial assistance to attend college. The awards are made possible through the A. and M. College Development Fund and by interested citizens and organizations of the State. Financial benefits range in value from $800 to $1600 with recipients receiving from $200 to $400 each year for four years plus an opportunity for additional earnings from student employment if necessary. Most of the awards are unrestricted as to course of study or degree objective in college.

Graduates of accredited high schools of Texas who have not attended another college or university, who are legal residents of this state, and who need financial assistance to attend college are eligible to make application for an Opportunity Award Scholarship. To be considered for such a scholarship, an applicant must satisfy the admission requirements of the College; must make formal application for an award on forms provided by the College; and must enter the state-wide competition which is held each spring. Selections are made by the Faculty Scholarships Committee on the basis of the applicant's academic record in high school; his scores on competitive examination; evidence of initiative, leadership, and other traits of good character; and his need for financial assistance. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Scholarships Committee.

This program is usually announced officially between February 20 and March 10 each year. Official announcements and application blanks are distributed over the State between these dates and are also made available to those interested upon request. Requests for additional information and application forms should be addressed to the Secretary, Faculty Committee on Scholarships, Office of the Registrar, A. and M. College of Texas, College Station, Texas.

### Scholarships for Advanced Undergraduate Students

One-year scholarships ranging in value from $100 to $750 are available to outstanding students already enrolled in the College. Some of these are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted in this regard. Recipients are usually chosen by the Faculty Committee on Scholarships in April or May each year with the basis of selection determined by the nature and intent of the award.

Some of these scholarships are given as "rewards for a job well done" and are intended to recognize outstanding scholastic achievement or other meritorious accomplishments. As such, they not only benefit financially the student concerned but also encourage and promote scholastic attainment and leadership on the part of other individuals. In addition to the reward type of scholarship, others are made available to outstanding students who must have financial assistance in order to remain in school or to do a high quality of work while enrolled. It is the general objective of this type of award to encourage every scholar to go as far as his abilities and ambition will carry him.

Information regarding scholarships for advanced undergraduate students may be obtained from the Secretary, Faculty Committee on Scholarships, Office of the Registrar.

# TRAINING FOR GOVERNMENT SERVICE

## Government Employment

The United States Government employs many college graduates trained in specialized fields of engineering, agriculture, and the natural and social sciences for assignment either at home or abroad. In some instances experience is a desirable or necessary qualification for federal employment. Within fixed limits graduate study is normally accepted as the equivalent of experience. Except for positions of high rank, employment is on the basis of competitive examinations. Information concerning these opportunities and Civil Service examinations to qualify for them is readily obtainable from any United States Post Office or from the Civil Service Commission, Washington 25, D. C.

## Agricultural Foreign Service

Recently many specialists in agriculture have been appointed to administer technical programs of the United States in foreign countries. In addition to their own field of specialization, such technically trained candidates will often find some knowledge of foreign language (French, German, Portuguese, Russian, or Spanish) useful. They should likewise command a good knowledge of our own language, government and history, and economics. Students who are interested in such a program should at the earliest possible date confer with the Dean of Agriculture and the head of the subject matter department of major interest in order to work out a satisfactory degree program.

## The Foreign Service of the United States

Superior students who plan to take the examinations for career officers in the Foreign Service of the United States are urged to consult the Head of the Department of History and Government or the Dean of Arts and Sciences. In general they should follow a broad program of study with emphasis on English, foreign languages, history and government, economics, mathematics and statistics, literature, geography, anthropology, and similar courses. Those primarily interested in Latin America might refer to the paragraph on Latin American studies in the School of Arts and Sciences for some specific suggestions. Besides the general examinations on the reading of English and on vocabulary, on statistics and mathematics, on general knowledge, and on written English, candidates take special examinations on world or United States history and government, economics, and modern languages.

# PREPARATION FOR TEACHING

Teacher education is an important part of the college curriculum, so much that it is a college-wide enterprise. The Council on Teacher Education, an administrative body comprised of representatives from all departments engaged in teacher education, gives general direction to the institutional program. All of the teacher preparation programs are fully certified and meet the standards set forth by the State of Texas.

Students who decide on a career in teacher education will find the field offers many challenging opportunities for advancement. The good teacher should possess a keen desire to work understandingly with youths, their parents, and his professional associates.

A student may prepare for teaching by selecting a program in one of four departments of the College. These are the Department of Agricultural Education in the School of Agriculture; the Department of Education and Psychology and the Department of Health and Physical Education, both in the School of Arts and Sciences; and the Department of Industrial Education in the School of Engineering.

The student may choose a first and second teaching field from among those listed below:

**First Teaching Field**

Agricultural Education
Biology
Chemistry
English
Health and Physical Education
History
Industrial Arts Education
Industrial Vocational Education
Journalism
Mathematics
Modern Languages
Physics

**Second Teaching Field**

Biology
Business Administration
Chemistry
Driver Education
English
General Science
History
Journalism
Mathematics
Modern Lauguages
Physics

An approved graduate program is available to those who wish to do additional work in either the Departments of Agricultural Education, Industrial Education, or Education and Psychology. A minor program is offered by the Department of Health and Physical Education. Professional programs are approved for certification of superintendents, principals, supervisors, counselors, visiting teachers, and master teachers within subject-matter areas.

The Placement Office of the College endeavors to assist graduates and students of the College in securing suitable teaching positions and to assist boards of education and other officials in securing teachers. The Placement Office makes every effort to place candidates who register for the service in good positions. Information obtained from professors and others is confidential. No charge is made for this service.

### Education and Psychology

The Department of Education and Psychology coordinates the programs of teacher preparation in the academic areas commonly taught in the high school. Teaching majors may be obtained in biology, chemistry, English, history, journalism, mathematics, modern foreign languages and business administration.

Students may choose to major in the Department of Education and Psychology or in the college department representing their subject-matter specialty. In either case the student must complete a 24-hour sequence in his principal teaching area and an 18-hour sequence in a second teaching area, or he must select a 48-hour approved program in the broad field of social studies or of natural sciences. In addition 24 hours of courses in education and psychology will be required for certification. Majors in the department itself will take 6 additional hours of professional education and will follow the four-year program outlined in the section of this catalogue devoted to School of Arts and Sciences.

The Department offers a graduate program leading to the Master of Education or Master of Science degrees. It prepares students for professional certification as master teachers or as superintendents, principals, supervisors, counselors or visiting teachers. Certification at the professional level requires three years of teaching experience in addition to graduate level training.

### Health and Physical Education

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; or (3) athletic trainer. Students completing the prescribed curriculum will be eligible for the Provisional All Grade Level Certificate in Health and Physical Education and a Provisional Secondary Certificate.

### Agricultural Education

Training provided in Agricultural Education prepares the prospective teacher to operate a program of vocational agriculture as an integral part of the high school educational system. The curriculum in Agricultural Education provides a well-rounded education in areas involving teacher-student and teacher-community relationships, science, technical agriculture, and general education.

Courses involving teacher-student and teacher-community relationships offered in the agricultural education curriculum are educational psychology, principles of agricultural education, course building for in-school youth, Future Farmer and Young Farmer activities, adult education, methods of developing supervised farming programs, student teaching in vocational agriculture, and agricultural journalism. These courses are designed to develop basic educational philosophies, methods of selecting problems to be taught, and methods of teaching in-school youth, young farmers, and adult farmers.

Thirty semester hours involving science are included in the agricultural education curriculum. This exceeds the number of hours required for a teaching certificate in science.

A minimum of 58 semester hours in technical agriculture is required for agricultural education graduates. This provides an opportunity for the graduate to have a knowledge of the technical agriculture that is essential for successfully teaching vocational agriculture.

General education receives emphasis in the agricultural education curriculum. This includes courses in English, history, government, mathematics, and economics. This training prepares the prospective high school teacher of vocational agriculture to operate an efficient educational program in agriculture. Since this educational program includes both high school students and adult farmers, the prospective teacher must be technically and professionally competent.

### Industrial Education

The Department of Industrial Education offers two options in teacher preparation. Qualified students may pursue any of the courses of study described below with reasonable assurance of being able to secure a position in the field for which they have prepared.

#### Industrial Arts Education

Graduates of this curriculum may become industrial arts teachers in the junior and senior high schools of the state. (Industrial arts in these schools includes general shop, electrical work, woodwork, technical drawing, plastics, ceramics, leather, and other craft courses.) The post war industrialization of the Southwest has created many outstanding opportunities for the prospective industrial arts teacher.

### Vocational Industrial Education

The vocational industrial teacher education option in the industrial education curriculum is intended for teachers, supervisors, and directors for the vocational industrial schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, a candidate for a degree must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan. The Head of the Department of Industrial Education will assist the student in the preparation of his degree plan.

## THE BASIC DIVISION

The Basic Division is a non-degree granting school which was established to aid entering students in their adjustment to college. The Associate Director of the Basic Division administers the work of all entering students (except those majoring in the School of Agriculture) until they are admitted into one of the degree granting schools.

### SPECIFIC AIMS

The aims of the Basic Division may be summarized as follows:

1. To give the first-year college student sufficient supervision to aid him in the transition from high school to college study and to help him adjust to college life.

2. To afford every student assigned to the Basic Division the benefits of a planned program of educational and vocational guidance so that he may make an intelligent choice of a course of study and related school activities.

3. To furnish the student who has not decided upon a course of study an opportunity to gain some insight into the educational requirements of the various curricula.

4. To furnish the necessary aid to the student who is in need of assistance in the development of general study skills or in specific subject areas.

5. To supply the various schools of the College with a selected group of students qualified to pursue the training necessary for professional competency and mature citizenship.

### PRE-COLLEGE TESTING AND COUNSELING SERVICE

Basic Division personnel are available throughout the spring and summer preceding fall registration for counseling with prospective students and their families. Frequent periods are scheduled in which placement tests are administered and interpreted, high school records are reviewed, and college goals of the individual are discussed with the counselor. The Basic Division welcomes opportunities to discuss the prospective student's background with him and to help him relate it to his future college and life goals. Their counselors, however, feel that they can be of particular service to the student at the scheduled testing and counseling periods which are announced each spring.

### NEW STUDENT ORIENTATION

Each new student is required to participate in the new student orientation program which is held prior to the beginning of the fall semester and is administered and coordinated by the Basic Division. The main objectives of the program are to provide the beginning student an opportunity for group and individual consultation with counselors, to acquaint him with the opportunities offered by the College and the many services available at the College, to acquaint him with College rules and regulations, and in general to introduce him to the College community. The counseling program is based in part upon the results of a series of tests, administered prior to or at the first of the program. Any student whose high school entrance units and grades, or whose scores on these tests indicate that he may have difficulty in pursuing the course he has chosen, may be advised to register in special sections designed to fit his particular needs. Likewise, students found to be superior may be offered advanced opportunities.

### GUIDANCE FUNCTIONS

The student enrolled in the Basic Division is offered many opportunities for both individual and group guidance. Opportunity for individual guidance and counseling by professionally trained personnel is provided throughout the school year. Members of the Basic Division Staff administer a battery of aptitude and achievement tests before the beginning of the school year. The results of these tests are employed for placement purposes with the objective of more fully assisting each new student to adjust to the academic requirements of the College. These tests are often supplemented by other psychological measures and are also utilized for other counseling purposes.

## TESTING SERVICE

Should a student desire to learn more about himself than the basic group of tests reveals, the Basic Division has available many additional aptitude, personality, and interest tests which he may take. Usually the student and his counselor decide which of the many tests available would be suitable and advisable.

## GROUP GUIDANCE

Each new student may enroll in special group guidance courses during his first year at the Agricultural and Mechanical College of Texas. The group guidance program should assist the beginning college student to anticipate and to master problems which are common to most beginning freshmen. A description of each of these courses is given in this catalogue. Basic 101, 102, 103, 104 and 105 are recommended for students who want special assistance or who are undecided about the course of study to pursue. Basic 106 and 107 are recommended for students who have their vocational goals more clearly in mind. The General Curriculum outlined on this page of the catalogue includes Basic 105 for vocational guidance reasons, since students following this curriculum are those who are not yet ready to designate their course of study. Any student having interest in, or feeling the need for, a Basic course may enroll during the Fall or Spring semester of his freshman year. Certain students demonstrating the need for assistance in the area of a Basic course may be required to register for that course which can most nearly resolve that need.

## REMEDIAL AID

Many opportunities for assistance are available to the student enrolled in the Basic Division. A Remedial Reading Laboratory and a Study Habits Program have been established to assist students needing special help in these areas. In addition special assistance in specific subject matter areas has been provided with the cooperation of the various academic departments of the degree granting schools.

## MENTAL HEALTH SERVICES

The staff of the Basic Division counsels with students concerning a great variety of personal problems. They work closely with the Mental Health Clinic of the College Hospital on a consultation and referral basis.

## BASIC DIVISION ASSEMBLY

During his first semester, one hour each week will be set aside in the student's schedule for the purpose of a special assembly to be supervised by the Basic Division. Attendance at this assembly is required of all first semester Basic Division students.

## CURRICULA FOR FRESHMAN STUDY

In general the Basic Division provides two types of curricula from which the entering student may select the one which best fits his own particular needs. These may be summarized as follows:

1. **General Curriculum.** The general curriculum is designed to meet the needs of the new student who has not decided upon a major field of study. It is arranged to assist the student in evaluating himself and in evaluating the several possible degree objectives, and at the same time to afford general courses that have application in almost all curricula. A student who decides upon his major field of interest by the beginning of the second semester may declare his degree objective and register for the courses outlined in that curriculum. If a student has not decided upon his degree objective by this time, he is advised to continue with the General Curriculum for the second semester.

## GENERAL CURRICULUM

| First Semester | Credit | |
|---|---|---|
| **Basic 105**<br>The World of Work | (0-2) | 1 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics** | | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 7 |
| **Physical Education 101** | (0-2) | R |
| | | 18 |

| Second Semester | Credit | |
|---|---|---|
| **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 10 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

Assignment to the specific courses listed above will be made in conference with a Basic Division staff member and in accord with the student's achievement. The courses designated as mathematics and elective will be assigned in line with the requirements of the curriculum in which the student expresses greatest interest.

As a part of the elective hours, a student may take either Biology 101, 107, 108, or Chemistry 101, 102 in the first and second semesters. Chemistry is required or is acceptable in more curricula than biology. A student evidencing a deficiency in mathematics may be required to delay chemistry a semester.

2. **Degree Curricula.** These plans of study are designed for the student who has decided upon the field in which he wishes to major as provided by one of the degree granting schools of the College. The specific courses required in the chosen curriculum may be determined by consulting the index of this catalogue for the page number where the desired curriculum is listed.

With approval of the Dean of the Basic Division, a student may register for any of the courses listed as "Basic" courses in the course description section of this catalogue, or for any other elective course for which he may have prerequisites. A student need not take an elective course that carries the exact hours of credit prescribed in his curriculum.

**A student whose high school record and entrance tests indicate inadequate preparation may be required to register for either a reduced load or special courses designed to meet his need.**

## INDIVIDUALIZED CURRICULA

For the student who has no specific curriculum in mind but who has decided upon a general area of study and who wishes to explore courses in several areas as a background for decision, an individualized plan of study can be arranged while the student is in the Basic Division. Likewise, students found to possess superior achievement in certain areas can be afforded challenging opportunities for advancement through this medium. Also, for students whose background in a particular area is discovered to be weak, certain strengthening course assignments and programs are made available through this arrangement.

## CURRICULUM FOR SECOND YEAR IN BASIC DIVISION

A student who is permitted to remain in the Basic Division a second year will first schedule courses to make up any deficiencies in his first year's work.

He will complete his schedule with courses required in the curriculum of his degree objective.

## REQUIREMENTS FOR TRANSFER TO A DEGREE GRANTING SCHOOL

A student may be transferred from the Basic Division to one of the degree granting schools (or into the pre-veterinary medicine curriculum administered by the School of Veterinary Medicine) whenever in the judgment of the Dean of the Basic Division and the Dean of the degree granting school such transfer is in the student's best interest.

Ordinarily, no student will be considered for transfer whose cumulative record shows less than 30 semester hours of credit and 30 grade points earned in two regular semesters, or less than 45 semester hours and 45 grade points in three regular semesters, or (if he is permitted to remain for a fourth semester) less than 60 semester hours with a grade point deficiency in excess of 10 on all hours undertaken in four semesters.

Students who wish to transfer from the Basic Division to the School of Engineering must have earned at least a number of grade points equivalent to the number of credits undertaken and must have at least a C-average in mathematics. In addition, the student may not be transferred while he has an F grade in a course unless he is currently enrolled in the course for the removal of the deficiency.

## JUNCTION ADJUNCT

Many of the counseling and guidance functions of the Basic Division are carried on during the summer at the Junction Adjunct. During a six-week term there, a student is able to discover more fully his aptitudes and interests and is helped in relating these to the demands and opportunities of various college curricula. Results of aptitude, achievement, interest, and personality tests are used to help the student know much more about himself than is otherwise possible. By knowing himself better, a student is able more intelligently to decide upon his course of study in college. Further, he is able to know the areas of his strength and his weakness, thus being able to capitalize upon the one and improve upon the other. Among the students who are especially urged to attend the Junction Adjunct are those whose high school average grade is under 80, and those who have not fully decided upon a course of study in college.

A student who is found to be prepared for regular college courses may enroll in the first course of college English and the first course in college mathematics in addition to a Basic Division course and the first course in physical education. A student who is found not to be prepared fully to progress with regular college courses is offered special help in the area of his weakness.

# THE SCHOOL OF AGRICULTURE

The various curricula in the School of Agriculture have as their main objectives the preparation of young men for farming, ranching, and other businesses associated with agriculture; for harvesting, processing, and marketing of food and fiber products; for the pursuit of scientific investigation in the broad field of agriculture, including soils, water and plant and animal products, both native and cultivated; for careers in teaching or extension work in agriculture; for work with various governmental and private agricultural agencies; or for the teaching of conservation and management of our natural and cultivated resources. Systematic training is given in the sciences of chemistry, physics, mathematics, and biology, all of which are fundamental to the study of scientific agriculture. The curricula offered give the student a wide range of choice in the selection of a major, and elective courses provide excellent opportunity for enlarging his field of learning in keeping with his individual interest and needs.

## FOUR-YEAR PROGRAMS

The following departments offer four-year programs:

- Agricultural Economics and Sociology
- Agricultural Education
- Agricultural Engineering
- Agronomy
- Animal Husbandry
- Dairy Science
- Entomology
- Floriculture and Landscape Architecture
- Horticulture
- Poultry Science
- Range and Forestry
- Wildlife Management

## INTERDEPARTMENTAL CURRICULA

Appropriate committees administer interdepartmental curricula in:

- Animal Science
- Food Technology
- Plant and Soil Science

## AGRICULTURAL JOURNALISM

This curriculum is administered by the Department of Journalism in the School of Arts and Sciences.

## DEPARTMENTS NOT HAVING FOUR-YEAR PROGRAMS

- Biochemistry and Nutrition
- Genetics
- Plant Physiology and Pathology

These departments do not have four-year programs but do offer courses which are basic to many of the major fields in agriculture. A student interested in a career in any of these subject matter fields should consult with a member of the staff of the appropriate department and ask that professional opportunities in the field of his interest be described to him. The equivalent of a major in these subjects may be developed through the curriculum in animal science or in plant and soil science.

## TWO-YEAR PROGRAM IN FORESTRY

The present curriculum includes the first two years of forestry.

## AGRICULTURAL ECONOMICS AND SOCIOLOGY

Trained personnel are needed in the fields of marketing, farm and ranch management, agricultural policy and finance, agricultural statistics and outlook, land economics, consumer economics, and rural sociology.

## AGRICULTURAL ECONOMICS

### Agricultural Administration Option

The program in agricultural administration prepares students for employment with governmental and private agencies; in such positions as research workers, marketing specialists, agricultural agents of banks and business firms; as extension workers; and as salesmen and teachers. Electives in business administration prepare students for work in businesses related to agriculture. Electives in technical agriculture prepare a student who wishes to become a specialist in the marketing of a particular farm product.

### Farm Management Option

The program in farm management prepares students for the operation of farms and ranches and for professional and commercial work dealing with agriculture. Electives in technical agriculture permit students to emphasize the study of particular agricultural enterprises.

## RURAL SOCIOLOGY

### Human Relations Option

The program affords professional training in human relations with special emphasis on social problems, community development, social anthropology, social work, criminology and juvenile delinquency, population, institutions, and group organization. Graduates are qualified for employment as case workers, Chamber of Commerce directors, probation or parole officers, and Boy Scout executives.

### Rural Leadership Option

This program affords professional training in rural leadership. Training is given in both the human side and the technical side of agriculture for students preparing to become county agricultural agents, participants in foreign agricultural programs, rural ministers, agricultural missionaries, and leaders in rural development programs.

## AGRICULTURAL EDUCATION

This curiculum, which includes well balanced selections in various areas of technical agriculture, is designed to give the teacher of vocational agriculture the preparation and training in both technical agriculture and professional education, including student teaching, required to qualify under the Texas Plan for Vocational Education.

In addition to being qualified to teach vocational agriculture, graduates of this curriculum find employment with the Agricultural Extension Service and the Soil Conservation Service, in agricultural public relations work with banks, with Chambers of Commerce and news gathering and reporting agencies, and with industries related to agriculture.

## AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is under the joint supervision of the School of Agriculture and the School of Engineering. Agricultural engineering deals with the application of the fundamental branches of engineering to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The term "agricultural engineer" denotes an engineer who has been trained in both engineering and agriculture, with experience in combining the two, and who is qualified to develop, design, organize, and direct engineering work in agriculture and closely allied industries.

In general, agricultural engineering may be broken down into five major phases of activity: power and machinery; agricultural structures design; farm electrification; agricultural process engineering; and soil and water control and conservation, which includes drainage, flood control, irrigation, and soil erosion control.

Graduates of this curriculum are prepared for service in teaching, extension, and research work; with government soil and water control projects; with manufacturers of farm equipment in advertising, sales, and design work; with engineering and contracting firms; with agricultural processing industries; and with building and equipment manufacturers.

## AGRICULTURAL JOURNALISM

The curriculum in agricultural journalism is designed to prepare students for professional careers as agricultural writers and editors, including work on bulletins and magazines as well as on rural and metropolitan newspapers, and in radio-TV broadcasting.

The first two years are planned to give students the fundamental studies. The program gives students an adequate background for general journalistic work and affords them opportunities to prepare themselves as specialists in certain phases of agricultural writing.

## AGRONOMY

The program in agronomy prepares students for work in the broad fields of soil management and crop production. Agronomic training gives the student a thorough understanding of the basic sciences and, in addition, teaches him how to apply this knowledge in the improvement of crops and soils. The first phase of training includes such subjects as mathematics, chemistry, botany, entomology, bacteriology, genetics, and plant physiology. Specialized courses in plant and soil science, which emphasize efficient crop production practices and the conservation and improvement of our soils, are provided in the last two years of the curriculum.

The agronomy graduate is well trained in those subjects dealing with crops and soils and is qualified for the numerous activities related to his field of training. Professional opportunities include those in farming, farm management, and land appraisal; in fertilizer manufacture and sales, seed companies, grain marketing and milling, and agricultural equipment and supply businesses; in extension and education as county agents, extension specialists, college instructors, agricultural public relation specialists and agricultural editors and directors; and in technical fields with the Agricultural Experiment Stations, United States Department of Agriculture and Soil Conservation Service.

## ANIMAL HUSBANDRY

The Department of Animal Husbandry is responsible for training the future producers, processors, extension personnel, and scientists of the livestock industry.

### Facilities

The Animal Industries Building houses the offices, classrooms, meats laboratory, library, and some of the research facilities of the Department. The Department farm of 1,280 acres is adjacent to the campus and maintains purebred herds of cattle, swine, sheep, and horses for use in teaching, research, and extension. Additional grade and crossbred cattle are located at the College plantation a short distance from the campus. Modern barns and equipment are utilized in teaching the latest methods of production and marketing. A complete meats laboratory is equipped to slaughter, process, and preserve all classes of livestock. Student help in the department is utilized to the fullest extent to provide students with financial assistance as well as valuable experience in handling livestock.

### Curricula

Two selections of curricula are offered students interested in livestock: production option and commercial option.

The production option is designed to meet the needs of future ranch managers, breed association fieldmen, county agents, livestock buyers, farm and ranch reporters, and related agricultural groups. The student will take courses in agronomy, range and forestry, animal breeding, and veterinary medicine as well as courses in animal science and technology. Elective courses are selected by the student with the aid of the departmental advisor.

The commercial option is designed to meet the needs of future meat plant operators, feed industry personnel, livestock market personnel, pharmaceutical representatives, and related agricultural interests. Courses are offered in accounting, personnel management, and salesmanship in addition to the basic production courses. Elective courses are selected with the aid of the departmental advisor.

Through the proper choice of elective courses, students may form a foundation for graduate study in either curriculum option.

## DAIRY SCIENCE

Trained personnel are much in demand to aid, service, manage, and direct the production, manufacture, and distribution of milk and dairy foods so important in the human diet.

### Dairy Manufacturing

This major is designed to prepare students for dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; merchandising and sales. Fundamental technical and business courses give a well rounded preparation for careers in the dairy industry and allied fields.

### Dairy Production

This major is designed to prepare students for careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding, or management; as extension dairy specialists and organization leaders and as workers in allied fields.

## ENTOMOLOGY

The program in entomology is intended to prepare students for careers in either research, extension, teaching, business, or industry. The curriculum includes basic studies in insect taxonomy, morphology, physiology, toxicology, and economic entomology. It also includes fundamental subjects in the various fields of agriculture as well as in the biological sciences.

## FLORICULTURE AND LANDSCAPE ARCHITECTURE

### Floriculture

Floriculture is that branch of agriculture concerned with the production, distribution, and marketing of ornamental plants and plant products.

The program in floriculture includes sound preparation in such sciences as botany, soils, entomology, and genetics to enable a graduate to breed, propagate, and distribute improved varieties of ornamental plants.

Floriculture is a business as well as a science, and the curriculum is designed to provide preparation for the highly technical and specialized growing operations of florist or nursery crop production, as well as specialized training for associated industries requiring sales people, floral designers, managers, executives, and experts in the packing, shipping, and storage operations connected with flowers and nursery stock. Opportunities for employment also exist in the fields of teaching, research, and extension.

### Landscape Architecture

The curriculum in landscape architecture is arranged to help students attain proficiency in the arrangement of ground and water forms and objects thereon for the purpose of securing the greatest returns in human use and enjoyment.

A successful landscape architect must possess or develop an artistic sense, engineering ability, the fundamentals of design and plant science, in addition to a knowledge of the basic elements of land, water, vegetation and the forces of nature.

Graduates are employed in private practice; by city, state, and regional planning boards; as managers of city park systems, university campuses, cemeteries, arboretums, and in various phases of activity with the National Park Service. Splendid opportunities also exist in teaching, extension and research in this field.

## HORTICULTURE

This program includes fundamental courses and specialized training in fruit growing, vegetable growing, plant propagation, and the processing of horticultural crops. Graduates are prepared for work as operators and owners of fruit orchards, vegetable farms, nurseries, and commercial processing plants. The training is also valuable for careers in teaching, extension, and research work in horticulture and related fields.

## POULTRY SCIENCE

The growth of the poultry industry and the need for a rapid expansion of scientific and technical knowledge in the various fields of science basic to successful poultry production have supplied the motivation for the development of courses in this phase of agriculture. In no field of agriculture is an understanding of the science and practice of feeding, breeding, physiology, pathology, heating, ventilation, processing, and marketing more necessary or more rewarded than in the modern intensive methods of producing poultry meat and eggs. Undergraduate students are trained to operate commercial poultry farms, hatcheries, feed mills, and poultry processing plants. They also find employment with such allied industries as feed manufacturers, equipment distributors, and manufacturers of vaccines and biologics, with poultry publications, and with the Extension Service. Many graduates in poultry science choose to take graduate work in this and allied fields.

## RANGE MANAGEMENT

This curriculum is designed to give students a thorough understanding of the great variety of problems met in the multiple use and conservation of non-cultivated grazing lands. The first phase of training includes work in the physical, biological, and social sciences. Specialized courses in range management, range ecology, agrostology, forestry, and conservation of natural resources are included in the last two years.

Graduates are prepared to enter the ranch business as owners or managers, for work as county agricultural agents, for work with Experiment Stations, and as college teachers in this field. A Bachelor's degree in range management gives the student the background for study toward advanced degrees. Men meeting Civil Service requirements are eligible for appointment with several United States Government agencies.

## WILDLIFE MANAGEMENT

This curriculum includes work in all phases of fisheries and wildlife. At the beginning of the sophomore year, the student should elect one of the two options, fisheries or wildlife, because of difference in the basic sciences required. The junior and senior years are largely years of specialization.

This curriculum is designed (1) to train young men in the art of managing wildlife on the land and of maintaining populations at levels consistent with good land-use practices and the desirability of the wildlife species involved; (2) to train men for research in taxonomy, distribution, and ecology of fishes, reptiles, amphibians, birds, and mammals; and (3) to train men for teaching at the high school and university levels. Opportunities are provided also, in cooperation with the Departments of Journalism and of Education, for training in the field of wildlife journalism and conservation education. For students planning on careers in research and/or teaching at the college level, an advanced degree will be required.

Upon completion of the wildlife management curriculum, graduates are prepared to enter occupations in the fisheries and/or wildlife fields, including management, research, teaching, and public relations. Men meeting Civil Service requirements are eligible for appointments with the United States Fish and Wildlife Service and other federal agencies. Also, graduates are eligible for employment by the various state game and fish commissions. A few positions are open from time to time as wildlife managers on private ranches and as writers of articles on outdoor life.

## INTERDEPARTMENTAL CURRICULA

The curricula in animal science, food technology, and plant and soil science are designed for students who are interested in the more technical and scientific problems in agriculture. There is an increasing demand from industry and from the field of agricultural research for trained men in each of these curricula. They have no separate department, but a student interested in a given curriculum should select his electives in the department in which he is most interested.

### Animal Science

Those who complete the curriculum in animal science will be qualified for graduate work in the fields of nutrition, animal breeding, genetics, physiology of reproduction, zoology, bio-statistics, and related fields. At the same time they are qualified for many of the positions available to graduates with a major in one of the animal curricula in the School of Agriculture.

### Food Technology

The curriculum in food technology is designed to train students in the technical and scientific problems of food processing and manufacturing. This course of study includes a number of elective hours, enabling the student to take major work in production, processing, inspection, and grading of dairy products, fruit and vegetable products, and miscellaneous foods and beverages. Students majoring in this curriculum are under the supervision of a committee on food technology, appointed from the agricultural teaching staff by the Dean of Agriculture.

### Plant and Soil Science

The curriculum in plant and soil science is designed to give students a technical background for the fields of plant breeding, plant pathology, plant physiology, turf management, soil fertility, soil physics and mineralogy. At the same time students are qualified for many other positions available to graduates with a major in one of the other plant curricula in the School of Agriculture.

The curriculum emphasizes the sciences of zoology, botany, and chemistry but also gives a firm foundation in mathematics, English, and other liberal arts and agricultural courses.

## FORESTRY

The two-year curriculum in forestry provides the student with fundamental courses necessary for him to enter a southern accredited school of forestry with junior standing. In addition to the arts and sciences, the curriculum includes the basic courses of plane surveying, agronomy, ecology, and forestry. The curriculum provides the fundamentals for study in the propagation, protection, and management of commercial timbers, the processing and manufacture of wood products, and the conservation of all products derived from forests. All accredited southern forestry schools have approved the curriculum as adequate to permit the student to obtain his Bachelor of Science degree in forestry upon the completion of two additional years of study. The Texas Legislature has provided funds which are available to defray certain out-of-state expenses for Texas students who attend accredited southern forestry schools for the junior and senior years.

During the junior and senior years, the forestry student has the opportunity to specialize in forest production, forest utilization, wood technology, pulp and paper technology, wood products merchandising, or extension and public relations forestry.

A degree from an accredited school of forestry prepares the graduate for work in the fields of forest administration, management, research, and education.

## Curricula in

## AGRICULTURE

(For Majors in Agronomy, Dairy Manufacturing, Dairy Production, Entomology, Horticulture, Poultry Science)

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

NOTES: 1. Electives shall be selected and substitutions made with the advice of the head of the student's major department.

2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## For a Major in AGRONOMY

### FRESHMAN YEAR

(See above)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Liberal Arts 311**<br>Use of Library Resources | (0-2) | 1 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products<br>**Or** | (3-0) | |
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agronomy 306**<br>Grain and Fiber Crops | (3-2) | 4 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 10 |
| | | 18 |

## For a Major in ANIMAL HUSBANDRY

### Commercial Option

(For students primarily interested in the meat, feed, or other related livestock industries)

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | **(2-3)** | **3** |
| **Biology 107**<br>Vertebrate Zoology | **(2-3)** | **3** |
| **Chemistry 101**<br>General Chemistry | **(3-3)** | **4** |
| **English 103**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **Mathematics 102**<br>Algebra | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physical Education 101** | **(0-2)** | **R** |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | **(3-0)** | **3** |
| **Agronomy 105**<br>Fundamentals of Crop Production | **(2-2)** | **3** |
| **Biology 101**<br>General Botany of Seed Plants | **(2-3)** | **3** |
| **Chemistry 102**<br>General Chemistry | **(3-3)** | **4** |
| **English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physical Education 102** | **(0-2)** | **R** |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | **(3-3)** | **4** |
| **Chemistry 231**<br>Elementary Organic Chemistry | **(3-0)** | **3** |
| **Dairy Science 202**<br>Dairying | **(2-2)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Entomology 201**<br>General Entomology | **(2-2)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 213**<br>Physics for Students of Agriculture | **(2-2)** | **3** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | 19 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery<br>**Or** | **(2-2)** | |
| **Agricultural Engineering 213**<br>Food Plant Engineering | **(2-3)** | **3** |
| **Biology 206**<br>Introductory Microbiology | **(2-4)** | **3** |
| **Business Administration 228**<br>Principles of Accounting | **(3-3)** | **4** |
| **Chemistry 223**<br>Elementary Quantitative Analysis | **(2-3)** | **3** |
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Elective** | | **2** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Animal Husbandry 303**<br>Animal Nutrition<br>**Or** | **(3-0)** | |
| **Biochemistry and Nutrition 401**<br>Human Nutrition | **(3-0)** | **3** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 301**<br>Writing for Professional Men<br>**Or** | **(3-0)** | |
| **Journalism 415**<br>Agricultural Journalism | **(2-2)** | **3** |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | **(2-2)** | **3** |
| **Elective** | | **6** |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | **(3-0)** | **3** |
| **Agronomy 301**<br>Introductory Soils | **(3-2)** | **4** |
| **Genetics 301**<br>Genetics | **(3-2)** | **4** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Elective** | | **3** |
| | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Animal Husbandry 437**<br>Marketing and Grading of Livestock and Meats | (2-2) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Veterinary Public Health 491**<br>Animal Hygiene | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## For a Major in
## ANIMAL HUSBANDRY

### Production Option

(For students primarily interested in livestock production and related problems)

## FRESHMAN YEAR

(Same as for Commercial Option, page 99)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agronomy 308**<br>Forage Crops<br>**Or** | (2-2) | |
| **Range and Forestry 401**<br>Range Improvement and Maintenance | (2-3) | 3 |
| **Animal Husbandry 409**<br>Feeds and Feeding | (2-2) | 3 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 417**<br>Pasture Management | (2-2) | |
| **Or** | | |
| **Range and Forestry 412**<br>Range Management Practices | (2-3) | 3 |
| **Animal Husbandry 437**<br>Marketing and Grading of Livestock and Meats | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| **Or** | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Veterinary Public Health 491**<br>Animal Hygiene | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **Englsh 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective*** | | 9 |
| | | 18 |

## For a Major in
## DAIRY MANUFACTURING

## FRESHMAN YEAR

(See page 97 with the addition of the following note: Students who expect to major in dairy manufacturing may substitute Mathematics 103 or 110 for Poultry Science 201 or Entomology 201.)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Dairy Science 311**<br>Technical Control of Dairy Products | (2-6) | 4 |
| **Dairy Science 316**<br>Butter and Cheese Manufacture | (3-4) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 5 |
| | | 18 |

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*Three hours to be selected from the social sciences.

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Dairy Science 407**<br>Ice Cream Manufacturing | (2-3) | 3 |
| **Dairy Science 415**<br>Condensed and Powdered Milk | (2-2) | 3 | **Dairy Science 410**<br>Dairy Plant Management | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | | **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 18 | | | 18 |

## For a Major in
## DAIRY PRODUCTION

## FRESHMAN YEAR
(See page 97)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 | **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Dairy Science 303**<br>Dairy Cattle Judging | (0-3) | 1 | **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 2 | **Elective** | | 3 |
| | | 18 | | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Dairy Science 417**<br>History and Development of Dairy Cattle | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Dairy Science 324**<br>Commercial Dairy Products | (3-0) | 3 |
| **Dairy Science 418**<br>Feeding and Management of Dairy Cattle | (3-2) | 4 |
| **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

## For a Major in ENTOMOLOGY

## FRESHMAN YEAR

(See page 97)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 402**<br>Agricultural Pests | (2-3) | 3 |
| **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## For a Major in FLORICULTURE

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Floriculture 224**<br>Principles of Floral Designing | (1-3) | 2 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Floriculture 221**<br>Fundamentals of Floriculture | (1-3) | 2 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 | **Floriculture 320**<br>Garden Flowers | (1-3) | 2 |
| **Floriculture 319**<br>Exotic Plants | (1-3) | 2 | **Floriculture 325**<br>Marketing of Ornamental Plants | (3-0) | 3 |
| **Floriculture 327**<br>Management Techniques of Floriculture | (1-3) | 2 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 | **Elective** | | 5 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 428**<br>Turf Management | (2-2) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Floriculture 424**<br>Propagation of Ornamental Plants | (2-2) | 3 |
| **Floriculture 429**<br>Greenhouse Crop Production | (3-3) | 4 | **Floriculture 430**<br>Nursery Crop Production | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 9 |
| | | 18 | | | 18 |

NOTES:

1. Students planning to do graduate work in plant science should elect Chemistry 227 and 228 in the sophomore year in place of Chemistry 231 and Floriculture 224.
2. Students interested in landscape construction and maintenance should elect Landscape Architecture 302 in the junior year and Landscape Architecture 305 in the senior year.

## For a Major in
## HORTICULTURE

### FRESHMAN YEAR

(See page 97)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Horticulture 311**<br>Processing Horticultural Crops | (2-3) | 3 |
| **Horticulture 322**<br>Vegetable Crops Management | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| **Or** | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Horticulture 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Entomology 405**<br>Fruit and Vegetable Insects | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## For a Major in
## POULTRY SCIENCE

### FRESHMAN YEAR
(See page 97)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | **(3-0)** | **3** |
| **Dairy Science 202**<br>Dairying | **(2-2)** | **3** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Entomology 201**<br>General Entomology | **(2-2)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 213**<br>Physics for Students of Agriculture | **(2-2)** | **3** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | **(2-2)** | **3** |
| **Biology 206**<br>Introductory Microbiology | **(2-4)** | **3** |
| **Chemistry 223**<br>Elementary Quantitative Analysis | **(2-3)** | **3** |
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Horticulture 201**<br>General Horticulture | **(2-2)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Elective** | | **3** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | **(3-0)** | **3** |
| **Genetics 301**<br>Genetics | **(3-2)** | **4** |
| **Poultry Science 411**<br>Poultry Feeding | **(3-2)** | **4** |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | **(2-2)** | **3** |
| **Elective** | | **4** |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | **(3-2)** | **4** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Poultry Science 303**<br>Turkey Production | **(2-0)** | **2** |
| **Poultry Science 308**<br>Hatchery Management | **(2-3)** | **3** |
| **Veterinary Microbiology 334**<br>Poultry Diseases | **(2-2)** | **3** |
| **Elective** | | **3** |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men<br>Or | **(3-0)** | |
| **Journalism 415**<br>Agricultural Journalism | **(2-2)** | **3** |
| **History 325**<br>Trends in American History | **(3-0)** | **3** |
| **Poultry Science 309**<br>Broiler Production | **(2-2)** | **3** |
| **Poultry Science 407**<br>Technology and Marketing of Poultry and Poultry Products | **(2-2)** | **3** |
| **Poultry Science 414**<br>Poultry Breeding | **(2-2)** | **3** |
| **Poultry Science 481**<br>Poultry Seminar | **(1-0)** | **1** |
| **Elective** | | **2** |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **History 326**<br>History of Texas | **(3-0)** | **3** |
| **Poultry Science 482**<br>Poultry Seminar | **(1-0)** | **1** |
| **Rural Sociology 407**<br>Human Relations in Agriculture | **(3-0)** | **3** |
| **Elective** | | **9** |
| | | 18 |

## Curricula in
## AGRICULTURAL ECONOMICS AND RURAL SOCIOLOGY

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## Curriculum in
## AGRICULTURAL ECONOMICS
## AGRICULTURAL ADMINISTRATION OPTION

### FRESHMAN YEAR
(See above)

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | 3 |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management<br>**Or** | (2-2) | |
| **Agricultural Economics 452**<br>International Trade and Agriculture | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 324**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 430**<br>Agricultural Finance | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 5 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 13 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. AGRICULTURAL BUSINESS ADMINISTRATION: Students preparing for work with business concerns allied with agriculture should elect from 9 to 18 credit hours of work in business administration and economics.
2. AGRICULTURAL MARKETING: Students preparing for work in argricultural marketing should elect from 9 to 18 hours in courses dealing with the production, grading, and marketing of commodities in which they are interested.
3. AGRICULTURAL ECONOMICS: Students preparing for professional work in agricultural economics and expecting to take graduate training should elect courses in the various social sciences, including courses in advanced economic theory.
4. Not more than 6 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.

## FARM MANAGEMENT OPTION

## FRESHMAN YEAR

(See page 107)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | **R** |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 202** | (0-2) | **R** |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records and Accounts | (2-2) | 3 |
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Elective** | | 1 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agricultural Economics 324**<br>Agricultural Prices | (3-0) | 3 | **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Agricultural Economics 432**<br>Farm and Ranch Organization and Operation | (2-2) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Elective** | | 10 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | | | 18 |
| **Elective** | | 5 | | | |
| | | 18 | | | |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Not more than 9 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.
2. Other electives shall be selected with view to strengthening the student's preparation for farm operation and closely related agencies and businesses.

## Curriculum in
## RURAL SOCIOLOGY
## HUMAN RELATIONS OPTION*

### FRESHMAN YEAR
(See page 107)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology<br>**Or** | (3-0) | | **Rural Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 | **Elective** | | 9 |
| **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Physical Education 202** | (0-2) | R |
| **Elective** | | 6 | | | 18 |
| **Physical Education 201** | (0-2) | R | | | |
| | | 18 | | | |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Education 321**<br>Secondary School Methods<br>**Or** | (3-0) | | **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 | **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Rural Sociology 314**<br>Social Problems | (3-0) | 3 | **Elective** | | 9 |
| **Elective** | | 8 | | | 18 |
| | | 18 | | | |

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*For students preparing to become Chamber of Commerce executives, probation or parole officers, YMCA secretaries, personnel in social work, etc.

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 | **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Rural Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Elective** | | 9 |
| **Rural Sociology 311**<br>Social Psychology | (3-0) | 3 | | | |
| **Rural Sociology 404**<br>Rural Community Development | (3-0) | 3 | | | |
| **Elective** | | 3 | | | |
| | | 18 | | | 18 |

NOTE: All electives must be approved by the Head of the Department. Not more than 9 elective credit hours of advanced courses in rural sociology may be applied toward requirements for graduation.

## RURAL LEADERSHIP OPTION

### FRESHMAN YEAR
(See page 107)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 | **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Range and Forestry 401**<br>Range Improvement<br>and Maintenance | (2-3) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | **Rural Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Rural Sociology 320**<br>Social Anthropology | (3-0) | 3 | **Rural Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **Elective** | | 2 | **Elective** | | 2 |
| | | 18 | | | 18 |

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*For students preparing to participate in foreign agricultural programs or to become county agricultural agents, rural ministers, agricultural missionaries, etc.

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives<br>**Or** | (3-0) | |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Rural Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Rural Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Rural Sociology 315**<br>The Family | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Not more than 9 elective hours of advanced courses in rural sociology may apply toward graduation.

## Curriculum in
## AGRICULTURAL EDUCATION

### FRESHMAN YEAR

(Same as for Agriculture, page 97)

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 325**<br>Farm Electricity | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Education 301**<br>Principles of Agricultural Education | (3-0) | 3 |
| **Agricultural Engineering 221**<br>Farm Shop | (1-3) | 2 |
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Government 305**[1]<br>Government of the United States and Texas | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Education 427**<br>Methods of Developing Farming Programs | (1-2) | 2 |
| **Agricultural Engineering 222**<br>Farm Shop | (1-3) | 2 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Agronomy 308**<br>Forage Crops | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 20 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 | **Agricultural Education 425**<br>Course Building | (2-0) | 2 |
| **Agricultural Education 431**<br>Student Teaching in Vocational Agriculture | (2-0) | 2 | **Agricultural Education 426**<br>Methods in Adult Agricultural Education | (2-0) | 2 |
| **Agronomy 318**<br>Soil Conservation | (3-3) | 4 | **Agricultural Education 432**[2]<br>Student Teaching in Vocational Agriculture | (2-6) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Animal Husbandry 416**<br>Livestock Management | (1-2) | 2 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | **Dairy Science 420**<br>Dairy Management | (1-2) | 2 |
| **Elective** | | 3 | **Poultry Science 401**<br>Management and Selection | (1-2) | 2 |
| | | 17 | **Elective** | | 3 |
| | | | | | 17 |

NOTES: 1. Students who do not have credit for four hours of Basic ROTC must take Government 306 and 307 in place of Government 305.

2. Laboratory hours in Agricultural Education 432 to include six weeks of student teaching.

3. Electives will be primarily in the field of technical agriculture subject to departmental approval.

## Curriculum in
## AGRICULTURAL ENGINEERING

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 | **Engineering Drawing 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 18 |
| | | 19 | | | |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Engineering 205**<br>Materials in Farm Structures | (2-3) | 3 | **Agricultural Engineering 208**<br>Farm Machinery | (3-3) | 4 |
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 19 |
| | | 19 | | | |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 324**<br>Automotive Machinery | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water<br>Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **Technical Elective*** | | 3 |
| **Elective** | | 3 |
| | | 16 |

| | | |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and<br>Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Farm Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 16 |

## For the Class Graduating in 1960-61

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water<br>Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 4 |
| | | 19 |

| | | |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and<br>Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Farm Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 19 |

## Curriculum in
## AGRICULTURAL JOURNALISM

## FRESHMAN YEAR

(Same as for Agriculture, page 97)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Journalism 201**<br>News Writing | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

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*To be selected from Civil Engineering 345 or 463 or Mechanical Engineering 338.

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 | **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 | **Journalism 311**<br>Radio and Television News Writing | (2-2) | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 | **Journalism 315**<br>Photography | (1-3) | 2 |
| **Elective** | | 4 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Journalism 410**<br>Publications Editing<br>and Designing | (1-3) | 2 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 | **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 | **Elective** | | 7 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

NOTE: Electives shall include at least 10 hours of advanced courses in agriculture.

## Curriculum in
## ANIMAL SCIENCE

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Animal Husbandry 107**[1]<br>General Animal Technology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective**[2] | | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates<br>**Or** | (2-4) | | **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Biology 343**<br>Histology | (2-3) | 3 | **Biology 344**<br>Embryology | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Elective** | | 4 |
| **Elective** | | 3 | | | 17 |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 410**[3]<br>Introductory Biochemistry | (3-3) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Biology 433**<br>General Physiology | (3-3) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 9 |
| | | 17 | | | 17 |

NOTES: 1. Dairy Science 202 or Poultry Science 201 may be substituted.

2. Entomology 201 or 208 or Chemistry 226 is recommended.

3. Animal Husbandry 303 plus 1 hour of elective or Poultry Science 411 may be substituted.

4. The student planning further study in animal husbandry, biochemistry and nutrition, dairy science, genetics, or poultry science should select suitable elective courses with the advice of the head of the appropriate department.

## Curriculum in
## FOOD TECHNOLOGY

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Mathematics 116**<br>Plane Trigonometry<br>and Analytic Geometry | (4-0) | 4 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Elective** | | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Dairy Science 326**<br>Food Preservation and Decomposition | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 7 | **History 326**<br>History of Texas | (3-0) | 3 |
| | | 19 | **Elective** | | 3 |
| | | | | | 19 |

NOTE: Students enrolled in food technology will select an option in meat, dairy, horticulture, or poultry products and, with the counsel of a member of the Food Technology Committee, will prepare a plan of study for his approval.

## Two-Year Curriculum in FORESTRY

## FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 | **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 18 |
| | | 18 | | | |

NOTE: Students who complete this two-year curriculum may continue their work for a degree in forestry in any accredited Southern forestry school. Funds have been appropriated by the Texas Legislature to help defray certain out-of-state expenses for Texas students attending such schools for their junior and senior years.

## Curriculum in
## LANDSCAPE ARCHITECTURE

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 |
| **Floriculture 221**<br>Fundamentals of Floriculture | (1-3) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Floriculture 224**<br>Principles of Floral Designing | (1-3) | 2 |
| **Landscape Architecture 201**<br>History of Landscape Design | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Landscape Architecture 301**<br>Introductory Landscape Design | (1-6) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Floriculture 320**<br>Garden Flowers | (1-3) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Landscape Architecture 302**<br>Landscape Design and Construction | (1-6) | 3 |
| **Elective** | | 7 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agronomy 428**<br>Turf Management | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Floriculture 319**<br>Exotic Plants | (1-3) | 2 |
| **Landscape Architecture 305**<br>Planting Design | (1-3) | 2 |
| **Landscape Architecture 407**<br>Landscape Maintenance | (1-3) | 2 |
| **Landscape Architecture 409**<br>Intermediate Landscape Design | (1-6) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Floriculture 325**<br>Marketing Ornamental Plants | (3-0) | 3 |
| **Landscape Architecture 408**<br>Park Management | (2-0) | 2 |
| **Landscape Architecture 410**<br>Advanced Landscape Design | (1-6) | 3 |
| **Elective** | | 8 |
| | | 18 |

# Curriculum in
# PLANT AND SOIL SCIENCE

## FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

NOTE: Students must select all electives with the advice of the head of the department in which they expect to take their major work.

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 4 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 12 |
| | | 18 |

## Curriculum in
## RANGE MANAGEMENT

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 309**<br>Agricultural Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Range and Forestry 303**<br>Agrostology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 308**<br>Farm Forestry | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Animal Husbandry 406**<br>Beef Cattle Production<br>Or<br>**Animal Husbandry 414**<br>Sheep, Goats, and Fiber Technology | (2-2)<br>(3-2) | 3 or 4 |
| **Range and Forestry 304**<br>Range Management | (2-3) | 3 |
| **Range and Forestry 309**<br>Silvics and Silviculture | (2-3) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 6 or 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Agronomy 310**<br>Soil Morphology | (1-3) | 2 |
| **English 301**<br>Writing for Professional Men<br>Or<br>**Journalism 415**<br>Agricultural Journalism | (3-0)<br>(2-2) | 3 |
| **Range and Forestry 409**<br>Advanced Range Management | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

## Curriculum in
## WILDLIFE MANAGEMENT

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Elective** | | 6 |
| | | 19 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Rural Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Elective** | | 6 |
| | | 19 |

### SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 408**<br>Techniques of Wildlife Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## FISHERIES OPTION

### FRESHMAN YEAR

(See page 120)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 | **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 19 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Agronomy 301**<br>Introductory Soils | (3-2) | 4 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 | **Biology 344**<br>Embryology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 | **Wildlife Management 312**<br>Ichthyology (Marine) | (2-3) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 19 | | | 18 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 | **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 417**<br>Biology of Fishes | (2-2) | 3 | **Wildlife Management 410**<br>Conservation and Management of Fishes | (3-0) | 3 |
| **Elective** | | 7 | **Elective** | | 9 |
| | | 17 | | | 18 |

NOTES:

1. Majors in the wildlife management option must participate in the summer field course, Wildlife Management 300, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

2. Majors in the fisheries option must participate in the summer field course, Wildlife Management 400, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

# THE SCHOOL OF ARTS AND SCIENCES

## CURRICULA

### LIBERAL ARTS

Economics
English (Language and Literature)
History and Government
Journalism
Mathematics
Modern Languages
Studies Preparatory to Law

### BUSINESS ADMINISTRATION

Accounting
Building Products Marketing
Finance
General Business
Insurance
Marketing
Personnel Administration

### PREPARATION FOR TEACHING

Education
Physical Education

### SCIENCE

Botany
Chemistry
Entomology
Meteorology
Microbiology
Physics
Studies Preparatory to
  Medicine and Dentistry
Zoology

### COMBINED DEGREE PLAN

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees — the Bachelor of Science degree in engineering, in the sciences, or in teacher training, or the Bachelor of Business Administration degree and the Bachelor of Arts degree in one of the liberal arts curricula. The student contemplating such a program is advised to consult the heads of both departments concerned in formulating a combined degree plan. (See page 53, "Two Degrees.")

### REQUIREMENT OF PROFICIENCY IN WRITTEN ENGLISH

In order to qualify for candidacy for a degree in the School of Arts and Sciences, all students majoring in departments of this school (Division of Business Administration; Departments of Biology, Chemistry, Economics, Education and Psychology, English, Health and Physical Education, History and Government, Journalism, Mathematics, Modern Languages, Oceanography and Meteorology, and Physics) must first demonstrate their ability to express themselves in acceptable English by passing a written examination in English composition. This examination must be taken not later than the spring semester of the junior year. Each student who fails to make a passing grade on a qualifying examination will be required to report to the Department of English for assignment for remedial work, which the student must complete satisfactorily without degree credit. Only if the Department of English has certified satisfactory completion of such remedial work and the student has passed his examination will the student be granted regular status as a candidate for a degree.

### ELECTIVES

In all curricula, elective hours are shown distributed over several semesters (one, two, or more a semester). The student is not expected to schedule his elective courses only in the units listed. He is free to schedule electives in whatever units he chooses up to and beyond the total number of elective hours in his curriculum. He may also exceed the hour requirement in any semester provided only that his record entitles him to carry the desired number of hours.

It is recommended that most of the elective courses be in fields other than the major, and that the student take at least one course outside his major field during each semester of his junior and senior years. For example, where possible a student in one of the curricula of business administration should choose electives outside the Division of Business Administration; the major in science should elect courses in the humanities and social sciences; and students in economics or history should elect courses in the natural sciences, in the humanities, and in business administration.

## LATIN AMERICAN STUDIES

A number of departments offer courses relating to Latin America, so that it is possible for many students (including some who are registered in the other schools of the College) to combine some concentration in Latin American studies with their regular departmental major. The program of offerings on Latin America is designed to meet the needs of four classes of students: (1) those who expect to enter into business in Latin America or into trade with Latin America; (2) those who contemplate a career in the foreign service of the United States Government or in any of the several government agencies in Washington which employ specialists on Latin America, with assignments both in the United States and in the foreign field; (3) those who expect to enter into teaching or research with emphasis upon Latin America; and (4) those who wish to broaden their education and acquire a better understanding of the people and the problems of Latin America. Any student who elects to coordinate some study of Latin America with a regular major in one of the College departments should consult the head of his major department for guidance in working out his program of study.

Those courses which bear directly on Latin American include the following:

| | | |
|---|---|---|
| **Economics 440**<br>Latin American Trade | (3-0) | 3 |
| **Geography 201**<br>Principles of Geography | (3-0) | 3 |
| **Geography 303**<br>Geography of South America | (3-0) | 3 |
| **History 313**<br>The Latin-American Nations to 1820 | (3-0) | 3 |
| **History 314**<br>The Latin-American Republics, 1820 to the Present | (3-0) | 3 |
| **History 422**<br>International Rivalry in the Gulf-Caribbean Area, 1820 to the Present | (3-0) | 3 |
| **Modern Language 305**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 306**<br>Modern Spanish-American Drama | (3-0) | 3 |
| **Modern Language 325**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 326**<br>Public Speaking in Spanish | (1-2) | 2 |
| **Modern Language 335**<br>Spanish-American Novel | (3-0) | 3 |
| **Modern Language 336**<br>Spanish-American Novel | (3-0) | 3 |

## LIBERAL ARTS

The curricula in liberal arts leading to the degree of Bachelor of Arts offer carefully planned programs of study in selected areas of the humanities and social sciences. They are intended for students whose interests, abilities, and aims are better served by a broad general education than by more specialized technological and scientific studies.

After completing one of these curricula, many students enter directly upon their life work. Others make their liberal arts course the foundation for additional education in a professional or graduate school. Special provision is made for those who wish to begin the study of law before they have completed the program for the Bachelor's degree.

In all of the programs the first two years are given over to introductory work in fundamental subjects. The purpose is to enable the student to attain experience and breadth of view so that he may take a more intelligent part in his own further education. During the last two years the student pursues a major and a minor field of study and appropriate electives, with guidance from the head of his major department and from the Dean of the School of Arts and Sciences.

## MAJOR AND MINOR STUDIES

By April 15 of his sophomore year, the student selects a major and a minor field of study according to the following directions:

1. One of the following subjects must be chosen as the field of major study: economics, English, history, journalism, mathematics, or modern languages.

2. For his minor study the student may select one of the above subjects other than that of his major study or one of the following: biology, business administration, chemistry, education, entomology, geography, geology and geophysics, government, health and physical education, meteorology, physics, psychology, or rural sociology.

3. The remainder of the elective work may be taken in any of the areas of study indicated above, or in other departments of the College, subject to the approval of the Dean of the School of Arts and Sciences.

4. To satisfy the requirements for graduation, a student must complete not less than thirty semester hours in his major study, of which at least twelve hours are in advanced courses (above the sophomore level), and not less than eighteen semester hours in his minor study, of which at least six hours are in advanced courses. Upon recommendation of the head of the student's major department, the Dean may authorize the substitution of courses in closely related departments for a limited number of hours in the major or minor study.

## FOREIGN LANGUAGE REQUIREMENT

The student will satisfy the foreign language requirement by completing four semesters of study in one language. If he can demonstrate by examination an adequate ability to read and speak a foreign language and a knowledge of its literature, he will be granted exemption from the language requirement. In no case does the exemption substitute for credit hours towards graduation.

With the approval of the Dean of the School of Arts and Sciences, a student who presents two units of a foreign language for admission may be allowed to take the beginning course in that language for credit.

## THE SOPHOMORE SCIENCE REQUIREMENT

A student whose curriculum includes a sophomore science requirement may satisfy this requirement in one of three ways:

1. Normally, he will schedule any two (one each semester) of the following survey courses: Chemistry 106, Geography 203, Geology 205, Physics 211.

2. Alternatively, he may substitute for the two survey courses any two-semester course in chemistry, geology, or physics.

3. By special permission of the Dean, he may be allowed to substitute the first semester of the usual two-semester introductory course in chemistry, geology, or physics for the survey course in that science. This last provision is intended to prevent unnecessary duplication in the program of students changing from one curriculum to another or transferring from another institution with science credit equivalent to an introductory rather than a survey course.

## Curricula in
## LIBERAL ARTS

### FRESHMAN YEAR
### For Majors in Economics, English, History, and Modern Languages

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**[3]<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 2 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

NOTES: 1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.

2. See "The Foreign Language Requirement", page 125.

3. Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## For a Major in
## ECONOMICS

Most students who major in economics enter upon a business career following their graduation. These students obtain a broad foundation for such a career by combining a judicious selection of courses in business administration with those prescribed in their major program. Other students find it desirable to obtain an undergraduate degree with a major in economics before entering law school. Still others pursue the four-year course in preparation for graduate study leading to careers in teaching, research, or government service.

### FRESHMAN YEAR
(See above)

### SOPHOMORE YEAR[3]

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 303** | (3-3) | 4 |
| Statistical Method | | |
| **Economics 323** | (3-0) | 3 |
| Economic Analysis | | |
| **Psychology 207** | (3-0) | |
| General Psychology | | |
| **Or** | | |
| **Psychology 303** | (3-0) | 3 |
| Psychology for Technical Students | | |
| **Elective**[4-5] | | 7 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Economic History**[6] | (3-0) | 3 |
| **Economics 311** | (3-0) | 3 |
| Money and Banking | | |
| **Economics (elective)** | (3-0) | 3 |
| **Government 306** | (3-0) | 3 |
| American National Government | | |
| **Elective**[4-5] | | 5 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Economics (elective)** | (3-0) | 3 |
| **Economics (elective)** | (3-0) | 3 |
| **English 403** | (1-2) | 2 |
| Speaking for Professional Men | | |
| **Elective** | | 9 |
| | | 17 |

| | | |
|---|---|---|
| **Economics 412** | (3-0) | 3 |
| Public Finance | | |
| **Economics (elective)** | (3-0) | 3 |
| **Economics (elective)** | (3-0) | 3 |
| **Elective** | | 7 |
| | | 16 |

NOTES: 1. See "The Foreign Language Requirement", page 125.

2. See "The Sophomore Science Requirement", page 125.

3. The student planning his advanced course of study should consult with the Head of the Department sometime during the second semester of his sophomore year to make out his degree plan. There is available a suggested program of work for those who wish to combine a major in economics with Latin American studies.

4. Business Administration 304 or 418 can substitute for three semester hours of economics electives.

5. Junior and senior electives are to be selected after consultation with the student's major advisor.

6. Credit for Economics 319 (Economic Development of the United States) or Economics 320 (Economic Development of Europe) will satisfy this requirement.

## For a Major in ENGLISH

The curriculum for a major in English is designed for breadth in education. In the Department of English, the English major studies writing skills, the language, and literature. Outside of the Department of English, he is required to study both physical and biological sciences, social sciences, foreign language, history, and philosophy. A large part of the program, however, especially in the junior and senior years, is left to the choice of the student. Through electives the student may extend his knowledge in the humanities, sciences, social sciences, or even technological skills. The curriculum for the English major, then, is suitable not only for the student who expects to continue his studies of the humanities in graduate school but also for the student who expects to go into business or to become a student of law or medicine or religion.

The student desiring both a full professional training and a broad general education may in five years complete the requirements for two degrees — Bachelor of Arts in English and Bachelor of Science in any one of the professional fields. For specific degree plans, which are made out for each individual entering this program, the student should consult the Dean of the School of Arts and Sciences and the dean of any other school in which he seeks a professional degree. (For degrees in English and in Engineering, see page 160; in English and in other fields in Arts and Sciences, page 123.)

## FRESHMAN YEAR

(See page 126)

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 231**<br>Survey of English Literature | (3-0) | 3 | **English 212**<br>Shakespeare | (3-0) | 3 |
| **History 213**<br>History of England | (3-0) | 3 | **History 214**<br>History of England | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

NOTES: 1. See "The Foreign Language Requirement", page 125.

2. See "The Sophomore Science Requirement", page 125.

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**<br>The English Language | (3-0) | | **English (elective)** | (3-0) | 3 |
| **Or** | | | **English 322**<br>Nineteenth Century Literature | (3-0) | 3 |
| **English 310**<br>Phonetics and Pronunciation | (3-0) | 3 | **Elective** | | 12 |
| **English 321**<br>Nineteenth Century Literature | (3-0) | 3 | | | 18 |
| **Government 306**<br>American National Government | (3-0) | 3 | | | |
| **Elective** | | 8 | | | |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 407**<br>Speaking and Oral Interpretation | (1-2) | 2 | **English (elective)** | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

## For a Major in HISTORY

## FRESHMAN YEAR
(See page 126)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **History 217**<br>Development of Europe | (3-0) | 3 | **History 218**<br>Development of Europe | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

NOTES: 1. See "The Foreign Language Requirement", page 125.

2. See "The Sophomore Science Requirement", page 125.

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **History (elective)** | | 6 | **History (elective)** | | 6 |
| **Elective** | | 8 | **Elective** | | 9 |
| | | 17 | | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **English 403** | **(1-2)** | **2** | **History (elective)** | | **3** |
| Speaking for Professional Men | | | **Elective** | | **14** |
| **History (elective)** | | **6** | | | |
| **Elective** | | **9** | | | **17** |
| | | **17** | | | |

## For a Major in JOURNALISM

Programs for students majoring in journalism are designed to prepare them for futures in the communications field. By the beginning of the junior year, each student determines, with the advice of members of the Department, what special phase of journalism he wishes to emphasize in his own program —community newspapers, urban newspapers, news-editorial work, advertising, business management, industrial writing and editing, radio-TV journalism. A major in agricultural journalism is available for students interested primarily in the field of technical journalism, serving agriculture.

Upon completing the curriculum, most students enter either the news or advertising departments of newspapers or magazines. Other students find opportunities in the radio field and in public relations.

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees — the Bachelor of Science degree in a technical field such as Industrial Technology or the Bachelor of Business Administration in Personnel Administration concurrently with the Bachelor of Arts degree in Journalism. See page 123.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115** | **(3-3)** | **4** | **English 104** | **(3-0)** | **3** |
| Survey of Biology | | | Composition and Rhetoric | | |
| **English 103** | **(3-0)** | **3** | **History 106** | **(3-0)** | **3** |
| Composition and Rhetoric | | | History of the United States | | |
| **History 105** | **(3-0)** | **3** | **Mathematics 110** | **(3-0)** | **3** |
| History of the United States | | | Survey Course in Mathematics | | |
| **Mathematics 102** | **(3-0)** | **3** | **Military or Air Science** | **(0-3)** | **1** |
| Algebra | | | **Modern Language[1]** | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Science[2]** | **(3-3)** | **4** |
| **Modern Language[1]** | **(3-0)** | **3** | **Elective** | | **1** |
| **Physical Education 101** | **(0-2)** | **R** | **Physical Education 102** | **(0-2)** | **R** |
| | | **17** | | | **18** |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203** | **(3-0)** | **3** | **Economics 204** | **(3-0)** | **3** |
| Principles of Economics | | | Principles of Economics | | |
| **English 212** | **(3-0)** | **3** | **English 232** | **(3-0)** | **3** |
| Shakespeare | | | Survey of English Literature | | |
| **Journalism 201** | **(2-3)** | **3** | **Journalism 202** | **(2-3)** | **3** |
| News Writing | | | Beginning News Reporting | | |
| **Journalism 205** | **(2-3)** | **3** | **Journalism 315** | **(1-3)** | **2** |
| Principles of Typography | | | Photography | | |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language[1]** | **(3-0)** | **3** | **Modern Language[1]** | **(3-0)** | **3** |
| **Elective** | | **1** | **Rural Sociology 205** | **(3-0)** | **3** |
| **Physical Education 201** | **(0-2)** | **R** | Principles of Sociology | | |
| | | **17** | **Physical Education 202** | **(0-2)** | **R** |
| | | | | | **18** |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 |
| **Elective** | | 8 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | |
| **Or** | | |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English (elective)**[3] | | 3 |
| **Journalism 306**<br>Newspaper Production and Management | (2-2) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| **Elective** | | 4 |
| | | 16 |

## SUMMER WORK

Journalism 300; Summer Practice, ten weeks, required.

## SENIOR YEAR

| | | |
|---|---|---|
| **English (elective)**[3] | | 2 |
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Journalism 409**<br>History and Principles of Journalism | (3-0) | 3 |
| **Elective** | | 9 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 410**<br>Publications Editing and Designing | (1-3) | 2 |
| **Journalism 412**<br>Editorial Writing | (3-0) | 3 |
| **Journalism (elective)** | | 3 |
| **Elective** | | 7 |
| | | 17 |

NOTES:

1. See "The Foreign Language Requirement", page 125.
2. The student may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. The student may select any one of the following: English 325, 328, 340, 350, 371, 375.
4. The Journalism Department has assembled information on the various areas of emphasis which will prove a valuable guide to a student planning his advanced course of study and choosing his electives at the beginning of the junior year.
5. The Journalism Department, in cooperation with the Texas Daily Newspaper Association, offers a 10-week professional internship program for selected students who have demonstrated superior ability. These internships are available only during the summer following the junior year
6. For further information on agricultural journalism, see pages 93 and 113.

## For a Major in
## MATHEMATICS

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | **(3-3)** | **4** | **English 231 or 232**<br>Survey of English Literature | **(3-0)** | **3** |
| **English 212**<br>Shakespeare | **(3-0)** | **3** | **History 106**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 210**<br>Calculus | **(3-0)** | **3** | **Mathematics 307**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**<br>French, German, or Spanish | **(3-0)** | **3** | **Modern Language**<br>French, German, or Spanish | **(3-0)** | **3** |
| **Physics 219**<br>Sound, Light, Electricity | **(3-3)** | **4** | **Physics 220**<br>Modern Physics | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | **18** | | | **17** |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** | **Mathematics (elective)** | | **6** |
| **Mathematics 308**<br>Differential Equations | **(3-0)** | **3** | **Modern Language**<br>French, German, or Spanish | **(3-0)** | **3** |
| **Modern Language**<br>French, German, or Spanish | **(3-0)** | **3** | **Elective** | | **5** |
| **Elective** | | **5** | | | **17** |
| | | **17** | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** | **Mathematics (elective)** | | **3** |
| **Mathematics (elective)** | | **3** | **Elective** | | **14** |
| **Elective** | | **12** | | | **17** |
| | | **17** | | | |

**NOTE:** The minor field of study should be chosen only after consultation with the Head of the Department of Mathematics, who will help the student arrange a program appropriate to his plans following graduation.

## For a Major in
## MODERN LANGUAGES

### FRESHMAN YEAR

(See page 126 with Spanish required as the modern language.)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 212**<br>Shakespeare | **(3-0)** | **3** | **English 231 or 232**<br>Survey of English Literature | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1]<br>Spanish | **(3-0)** | **3** | **Modern Language**[1]<br>Spanish | **(3-0)** | **3** |
| **Science**[2] | **(3-3)** | **4** | **Science**[2] | **(3-3)** | **4** |
| **Elective** | | **3** | **Elective** | | **3** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | **17** | | | **17** |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**[3]<br>The English Language | **(3-0)** | **3** | **English 310**[3]<br>Phonetics and Pronunciation | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** | **Modern Language**<br>Spanish | **(3-0)** | **3** |
| **Modern Language**<br>Spanish | **(3-0)** | **3** | **Modern Language**<br>French, German, or Russian | **(3-0)** | **3** |
| **Modern Language**<br>French, German, or Russian | **(3-0)** | **3** | **Elective** | | **9** |
| **Elective** | | **5** | | | **18** |
| | | **17** | | | |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 313**[4]<br>The Latin American Nations to 1820 | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>Spanish | | 2 |
| **Elective** | | 7 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **History 314**[4]<br>The Latin American Republics, 1820 to the Present | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>Spanish | | 2 |
| **Elective** | | 9 |
| | | 17 |

NOTES:
1. See "The Foreign Language Requirement", page 125. Students who take beginning Spanish in their freshman year must elect 6 hours of advanced Spanish in their senior year.
2. See "The Sophomore Science Requirement", page 125.
3. For those who do not expect to teach, a substitution in economics or history will be allowed upon approval by the Head of the Department of Modern Languages.
4. In case of unavoidable conflict with another required course, a substitution in the fields of history or economics will be allowed upon approval by the Head of the Department and the Dean of the School of Arts and Sciences.
5. Recommended electives: Advanced courses in economics, geography, or history.
6. For most students majoring in modern languages, economics, English, and history are logical minors.

## Studies Preparatory to LAW

Students who plan to obtain an undergraduate degree before undertaking the study of law will normally register for one of the regular degree programs. Particularly appropriate are the programs in business administration, economics, English, and history. Students who plan to complete no more than three years of undergraduate work before entering law school will matriculate in the three-year preparatory program listed below. Any student who completes this program may still earn a Bachelor of Arts degree with a major in history and a minor in economics by completing one additional year of course work as follows: History 318 and 423 (first semester), 424 and a 3-hour history elective (second semester), Economics 321 and 324, English 403, and sixteen hours of electives, including if possible Business Administration 303.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | **(3-3)** | **4** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **English 212**<br>Shakespeare | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1]<br>French, German, or Spanish | **(3-0)** | **3** |
| **Science**[2] | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | **(3-3)** | **4** |
| **Economics 319**<br>Economic Development of the United States | **(3-0)** | **3** |
| **English 231 or 232**<br>Survey of English Literature | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1]<br>French, German, or Spanish | **(3-0)** | **3** |
| **Science**[2] | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **18** |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 311**<br>Money and Banking | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **History 213**<br>History of England | **(3-0)** | **3** |
| **Liberal Arts 301**<br>Introduction to Philosophy | **(3-0)** | **3** |
| **Psychology 303**<br>Psychology for Technical Students | **(3-0)** | **3** |
| **Elective** | | **3** |
| | | **18** |

| | | |
|---|---|---|
| **Economics 412**<br>Public Finance | **(3-0)** | **3** |
| **Government 307**<br>State and Local Government | **(3-0)** | **3** |
| **Government 308**<br>United States Constitutional Development | **(3-0)** | **3** |
| **History 214**<br>History of England | **(3-0)** | **3** |
| **Liberal Arts 304**<br>Philosophies of Life | **(3-0)** | **3** |
| **Elective** | | **3** |
| | | **18** |

NOTES:

1. See "The Foreign Language Requirement", page 125.
2. To satisfy the requirement in physical science, the student may choose one of the following: Chemistry 101, 102 or Physics 201, 202.
3. The American Bar Association minimum requirement for admission to an accredited law school is three years of acceptable college work. Students who plan to seek admission to a law school after completing the three-year program listed above are strongly advised to check the program with the registrar of the school of their choice before beginning the third year. If necessary to meet specific requirements, substitutions may be approved by the Dean of the School of Arts and Sciences. Students planning to attend the Law School of the University of Texas must use the 6 semester hours of elective in the junior year for advanced courses (300-400 level) in economics, government, history, or sociology.
4. A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year pre-law curriculum here and at least one year at an accredited law school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

## BUSINESS ADMINISTRATION

The several curricula in business administration provide training for business careers. The freshman year is the same in all curricula with the exception of building products marketing. A student who plans to major in building products marketing follows a separate course of study beginning with his freshman year. Other students elect a major field at the beginning of the sophomore year choosing one of the following: accounting, finance, general business, insurance, marketing, personnel administration.

Each curriculum contains courses essential to a general education and permits the study of fundamental business theory and procedure with limited specialization in one of the major fields. Upon the completion of his chosen curriculum, the student receives the degree of Bachelor of Business Administration.

## Curricula in BUSINESS ADMINISTRATION

(For Majors in Accounting, Finance, General Business, Insurance, Marketing, Personnel Administration)

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 115** Survey of Biology | (3-3) | 4 | **English 104** Composition and Rhetoric | (3-0) | 3 |
| **Business Administration 105** Introduction to Business | (3-0) | 3 | **History 106** History of the United States | (3-0) | 3 |
| **English 103** Composition and Rhetoric | (3-0) | 3 | **Mathematics 110** Survey Course in Mathematics | (3-0) | 3 |
| **History 105** History of the United States | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Mathematics 102**[1] Algebra | (3-0) | 3 | **Science**[2] | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Elective** | | 3 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

NOTES: 1. Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the student's capabilities. Mathematics 101 does not carry degree credit.

2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.

## For a Major in ACCOUNTING

The curriculum in accounting offers a professional course of training for employment in commercial and industrial accounting, public accounting, or governmental accounting. Positions in these fields are generally designated as accountant, public accountant, certified public accountant, tax accountant, auditor, cost accountant, internal auditor, and controller. The basic business training obtained in this curriculum also qualifies graduates for employment eventually leading to executive positions in industry.

### FRESHMAN YEAR

(See above)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205** Marketing | (3-0) | 3 | **Business Administration 228** Principles of Accounting | (3-3) | 4 |
| **Business Administration 227** Principles of Accounting | (3-3) | 4 | **Business Administration 303** Statistical Method | (3-3) | 4 |
| **Economics 203** Principles of Economics | (3-0) | 3 | **Economics 204** Principles of Economics | (3-0) | 3 |
| **English 203** Introduction to Literature | (2-0) | 2 | **English 210** Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306** American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 16 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 304** Business Cycles and Business Measurements | (3-0) | 3 | **Business Administration 305** Business Law | (3-0) | 3 |
| **Business Administration 327** Intermediate Accounting | (2-3) | 3 | **Business Administration 328** Intermediate Accounting | (2-3) | 3 |
| **Business Administration 329** Cost Accounting | (3-0) | 3 | **Business Administration 332** Cost Accounting | (3-0) | 3 |
| **Economics 311** Money and Banking | (3-0) | 3 | **English 301** Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 5 | **Elective** | | 5 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 306**<br>Business Law | (3-0) | 3 | **Business Administration 402**<br>Accounting Systems | (2-0) | 2 |
| **Business Administration 330**<br>Advanced Accounting | (3-0) | 3 | **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 407**<br>Auditing | (3-0) | 3 | **Business Administration 406**<br>Managerial Accounting<br>Or | (3-0) | |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 408**<br>Auditing | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Elective** | | 10 |
| **Elective** | | 4 | | | |
| | | 18 | | | 18 |

NOTE: The following electives are suggested:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 | **Business Administration 416**<br>Oil Production Accounting | (3-0) | 3 |
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 | **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 | **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 | **Business Administration 433**<br>Business Management | (3-0) | 3 |
| **Business Administration 317**<br>Punch Card Methods | (1-2) | 2 | **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Business Administration 322**<br>Property Insurance | (3-0) | 3 | **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Business Administration 333**<br>Business Machines | (0-2) | 1 | **Economics 424**<br>Economics of Transportation | (3-0) | 3 |

## For a Major in
## BUILDING PRODUCTS MARKETING

The curriculum in building products marketing was developed in cooperation with the retail building materials industry, the Lumberman's Association of Texas, and the National Retail Lumber Dealers Association. It is designed to train persons who plan to seek employment in the building materials industry. Students who complete this program will have an educational foundation for responsible positions in this industry.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 | **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 16 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the student's capabilities. Mathematics 101 does not carry degree credit.

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agricultural Engineering 205**<br>Materials and Farm Structures | (2-3) | 3 | **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 216**<br>Building Products | (0-2) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Engineering Drawing 221**<br>Building Construction Drawing | (1-3) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Physics 211**<br>A Brief Survey of Physics | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 329**<br>Cost Accounting | (3-0) | 3 | **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 4 |
| **Elective** | | 4 | | | 17 |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 315**<br>Insurance | (3-0) | 3 | **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 461**<br>Retailing Building Products | (2-0) | 2 | **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Elective** | | 7 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

NOTE: A minimum of 12 weeks of practice in the industry is required. This practice is to be approved in advance, and suitable reports are to be submitted on each assignment.

### For a Major in
### FINANCE

The curriculum in finance provides instruction in the principles, methods, instruments, and institutions of finance with specialized training in the techniques and practices of financial management. The student receives training in accounting, economics, business law, and elective fields, which provides a balanced background for specialization in finance.

The principal objective of the program is to prepare students for managerial positions in such fields of business finance as commercial banking, investment banking, securities brokerage, trust management, and property management. The program also provides training for employment with governmental agencies engaged in lending operations and regulation of securities markets.

## FRESHMAN YEAR

(See page 134)

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 432**<br>Security Analysis | (3-0) | 3 |
| **Business Administration 434**<br>Problems in Finance | (3-0) | 3 |
| **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTE: The following courses are suggested electives:

| | | |
|---|---|---|
| **Agricultural Economics 430**<br>Agricultural Finance | (3-0) | 3 |
| **Business Administration 320**<br>Life Insurance | (3-0) | 3 |
| **Business Administration 322**<br>Property Insurance | (3-0) | 3 |
| **Business Administration 324**<br>Casualty Insurance and Suretyship | (3-0) | 3 |
| **Business Administration 330**<br>Advanced Accounting | (3-0) | 3 |
| **Business Administration 352**<br>Personal Finance | (2-0) | 2 |
| **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 438**<br>Commercial Bank Management | (3-0) | 3 |
| **Business Administration 442**<br>Real Estate Practice | (3-0) | 3 |

## For a Major in
## GENERAL BUSINESS

Students who do not wish to major in one of the several special fields in business administration should follow the curriculum in general business. This curriculum includes one or more courses in each of the fields of business administration and thereby provides a broad training for business careers. It is designed for those planning to establish their own business or preparing for employment eventually leading to responsible positions in industry.

### FRESHMAN YEAR

(See page 134)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTE: The following courses are suggested electives:

| Course | Hours | Credits |
|---|---|---|
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 |
| **Business Administration 320**<br>Life Insurance | (3-0) | 3 |
| **Business Administration 322**<br>Property Insurance | (3-0) | 3 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 328**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 329**<br>Cost Accounting | (3-0) | 3 |
| **Business Administration 344**<br>Marketing Problems | (3-0) | 3 |
| **Business Administration 427**<br>Insurance Law | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 |
| **Business Administration 433**<br>Business Management | (3-0) | 3 |
| **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Economics 424**<br>Economics of Transportation | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Geography 204**<br>Economic Geography | (3-0) | 3 |

## For a Major in
## INSURANCE

The insurance industry is seeking an increasing number of college graduates for positions as agents, agency managers, underwriters, claim adjusters, payroll auditors, safety engineers, and executives. The insurance field includes life, property, and casualty insurance, and corporate suretyship. The curriculum in insurance is designed to provide the specialized training for students who plan to enter this field, whether on their own account, with insurance companies, or with business or industrial concerns.

### FRESHMAN YEAR

(See page 134)

### SOPHOMORE YEAR

| Course | Hours | Credits |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Course | Hours | Credits |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| Course | Hours | Credits |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 322**<br>Property Insurance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

| Course | Hours | Credits |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 320**<br>Life Insurance | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 324**<br>Casualty Insurance and Suretyship | (3-0) | |
| Or | | |
| **Business Administration 437**<br>Applied Life Insurance | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 427**<br>Insurance Law | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

NOTE: The following courses are suggested electives:

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Business Administration 312**<br>Statistical Charts and Graphs | (2-0) | 2 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 |

| | | |
|---|---|---|
| **Business Administration 329**<br>Cost Accounting | (3-0) | 3 |
| **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 |
| **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **Business Administration 442**<br>Real Estate Practice | (3-0) | 3 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |

## For a Major in
## MARKETING

The field of marketing is diversified in the scope of its opportunities. Typical of the fields in which expansion is taking place is retail merchandising. Its major departments include store management, buying, publicity, merchandise planning, research, and personnel work. Market research will make increased demands upon those able to furnish management with the data necessary to keep abreast of marketing changes, to eliminate wasteful marketing methods, and to develop new products. The field of sales administration requires an ever-increasing number of individuals qualified to recruit, select, and train selling personnel. Also in this area lie the important functions of establishing sales territories, setting sales quotas, and sales costing. Personal selling is a field offering many opportunities for employment. In the field of advertising a student may gain added proficiency by electing advertising courses taught in the Department of Journalism.

By careful selection of electives, a student can specialize in one of the different fields of marketing or gain general knowledge in anticipation of starting his own business.

## FRESHMAN YEAR
(See page 134)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Geography 204**<br>Economic Geography | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | 0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 | **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 344**<br>Marketing Problems | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 445**<br>Marketing Research | (3-0) | 3 | **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 5 |
| | | 17 | | | 17 |

NOTE: Six hours of electives are to be selected from the following:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 | **Business Administration 456**<br>Applied Salesmanship | (0-2) | 1 |
| **Business Administration 318**<br>Wholesale Merchandising | (3-0) | 3 | **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 | **Rural Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Business Administration 447**<br>Advertising Procedures | (3-0) | 3 | | | |

## For a Major in
## PERSONNEL ADMINISTRATION

The curriculum in personnel administration provides training for employment in the personnel departments of industrial concerns, public institutions, and governmental agencies, especially those agencies concerned with employer-employee relations. In recent years employer-employee relations have become a major problem of business and society, with the result that there is an increasing demand for qualified college graduates to work in this important field.

## FRESHMAN YEAR

(See page 134)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 16 |
| | | 18 | | | |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | **(3-3)** | **4** |
| **Business Administration 306**<br>Business Law | **(3-0)** | **3** |
| **English 301**<br>Writing for Professional Men | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Elective** | | **4** |
| | | **17** |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | **(3-0)** | **3** |
| **Business Administration 418**<br>Corporation Finance | **(3-0)** | **3** |
| **Business Administration 422**<br>Personnel Problems of Industry | **(3-0)** | **3** |
| **Economics 318**<br>Economics of Labor | **(3-0)** | **3** |
| **Elective** | | **6** |
| | | **18** |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 423**<br>Personnel Policies and Techniques | **(3-0)** | **3** |
| **Business Administration 435**<br>Salesmanship | **(3-0)** | **3** |
| **Economics 435**<br>Economics of Collective Bargaining | **(3-0)** | **3** |
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Journalism 321**<br>Industrial Journalism | **(2-2)** | **3** |
| **Elective** | | **3** |
| | | **17** |

| | | |
|---|---|---|
| **Economics 437**<br>Government and Labor Relations | **(2-0)** | **2** |
| **Industrial Education 328**<br>Industrial Accident Prevention | **(3-0)** | **3** |
| **Psychology 401**<br>Industrial Psychology | **(3-0)** | **3** |
| **Elective** | | **9** |
| | | **17** |

NOTE: The following courses are suggested electives:

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | **(3-0)** | **3** |
| **Business Administration 320**<br>Life Insurance | **(3-0)** | **3** |
| **Business Administration 322**<br>Property Insurance | **(3-0)** | **3** |
| **Business Administration 420**<br>Principles of Investment | **(3-0)** | **3** |
| **Business Administration 433**<br>Business Management | **(3-0)** | **3** |
| **Business Administration 436**<br>Sales Management | **(3-0)** | **3** |
| **Business Administration 463**<br>Employee Supervision | **(2-0)** | **2** |
| **Economics 319**<br>Economic Development of the United States | **(3-0)** | **3** |
| **Industrial Education 406**<br>Vocational Guidance | **(2-0)** | **2** |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | **(3-0)** | **3** |

## PREPARATION FOR TEACHING

### EDUCATION AND PSYCHOLOGY

The Department of Education and Psychology offers teacher education programs for teaching in secondary schools leading to the degree of Bachelor of Arts or Bachelor of Science. The degree of Bachelor of Arts will require 12 hours of modern language. Students desiring to teach in the public schools may choose to major either in the Department of Education and Psychology or in a subject-matter area such as biology or mathematics.

Candidates preparing for work in the teacher education fields should select their courses under the guidance of the departmental advisor. Students beginning their teacher education program after September 1, 1955, will be eligible to receive the provisional certificate upon completing the requirements for the Bachelor's degree and being recommended by the Department to the Texas Education Agency. The Department of Education and Psychology also offers advanced undergraduate and graduate courses in preparation for certification at the professional level as master teachers, visiting teachers, counselors, supervisors, principals, and superintendents.

Students majoring in the Department of Education and Psychology or working toward the provisional or the professional certificate will be assigned an advisor who will counsel with the student during his teacher education program. Majors in the Department of Education and Psychology will follow the program outlined on pages 143, 144, and 145. Students majoring in subject-matter departments and working toward a provisional certificate must meet the following minimum requirements: (1) 6 semester hours of pre-professional work in education and psychology, (2) 12 semester hours of professional work in education and psychology, (3) 6 semester hours in supervised teaching, (4) 42 to 48 semester hours in teaching areas or fields of specialization, (5) not less than 45 semester hours of general education, and (6) the completion of requirements for the Bachelor's degree. To meet the requirements for the professional certificate, the student must have at least three years of teaching experience and must have completed an approved program of at least 30 semester hours of graduate work beyond the Bachelor's degree requirements.

## PREPARATION FOR TEACHING WITH A MAJOR IN EDUCATION

| | | |
|---|---|---|
| I. General Education | | 60 hours |
| Biological Science | 6 hours | |
| Economics | 3 hours | |
| English | 13 hours | |
| General Psychology | 3 hours | |
| Government | 6 hours | |
| History | 6 hours | |
| Mathematics | 6 hours | |
| Physical Education | 6 hours | |
| Physical Science | 8 hours | |
| Rural Sociology | 3 hours | |

II. Plans of Specialization

Plan 1. The student must complete at least 24 hours of concentration in a subject-matter area identified with a field of teaching in the secondary schools and a minimum of 18 semester hours in a second subject-matter area. Teaching areas may be selected from the following: biology, chemistry, business administration, economics, English, geography, government, history, journalism, mathematics, modern language, physics. The exact courses involved will be chosen with the guidance of the student's advisor and the approval of the head of the department concerned.

Plan 2. The student may complete at least 48 hours of concentration in social studies or natural sciences.

| | | |
|---|---|---|
| III. Pre-Professional Education | | 6 hours |
| Introductory Education | 3 hours | |
| Educational Psychology | 3 hours | |
| IV. Professional Education | | 12 hours |
| Secondary School Methods | 3 hours | |
| Adolescent Psychology | 3 hours | |
| History and Philosophy of Secondary Education | 3 hours | |
| Secondary School Curriculum | 3 hours | |
| V. Professional Laboratory Experiences | | 6 hours |

Professional laboratory experiences consist of actual and direct contacts with youth in school, home, and community. They include observations made in connection with courses in psychology, instructional methods, and curriculum and testing. They also include participation in teaching activities during which the student accepts the direct responsibility for the success of a group of youth in a school situation. This experience will be given during the student's senior year upon the completion of the pre-professional and professional requirements in the teacher education program and satisfactory progress in the plan of specialization. Application for enrollment in supervised teaching must be made upon the recommendation of the student's advisor.

VI. Professional Electives........................................ 6 hours

The student will be required to take 6 hours of professional work in the field of education or psychology or the equivalent upon the recommendation and approval of the student's advisor. These experiences will be directed toward meeting the need of students preparing for special areas of work.

VII. Electives

Electives to satisfy the requirements of a teacher education program to make a total of 137 semester hours. These hours will be chosen with the consent of the advisor.

## Curriculum in
## EDUCATION

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102[1]**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry<br>**Or** | (3-0) | |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 203**<br>Introduction to Literature<br>**Or** | (2-0) | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 8 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 7 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Education 321**<br>Secondary School Methods | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 | **Rural Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Elective** | | 9 | **Elective** | | 9 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Education 421**<br>History and Philosophy of Education | (3-0) | 3 | **Education 425**<br>Supervised Student Teaching | (2-12) | 6 |
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 | **Education (elective)** | | 3 |
| **Education (elective)** | | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 | **Elective** | | 3 |
| **Elective** | | 6 | | | |
| | | 18 | | | 14 |

NOTES:

1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the student's capabilities in mathematics. Mathematics 101 does not carry degree credit.
2. With the consent of the student's advisor, the following substitutions may be made in the program outlined above:
   (1) Biological Sciences. A minimum of 6 hours of biological science is required. For Biology 101 and 107, students may substitute Biology 115 (3-3) and Biology 330 (2-0) or Biology 337 (2-0).
   (2) Physical Science. A minimum of 8 hours of physical science is required. For Chemistry 101 and 102, students may substitute Physics 201 (3-3) and 202 (3-3), or select 8 hours from these courses: Chemistry 106 (3-3), Physics 211 (3-3), Geology 205 (3-3), and Geography 203 (3-3).
3. The English elective in the sophomore year should be chosen from literature courses. Students planning to teach English in the secondary schools may substitute for English 203 or 210 a 3-hour English course chosen with the consent of the advisor. If a student writes unsatisfactorily, he may be required to take an additional course in writing, such as English 301.
4. In choosing electives, the student should keep in mind the requirements of his subject-matter area of teaching specialization.

## HEALTH AND PHYSICAL EDUCATION

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; (3) athletic trainer; or (4) corrective therapist. The Bachelor's degree is granted students who complete the prescribed program of studies in professional education, physical education, and general education, and establish a teaching minor in one of the usual secondary school subject matter fields. The choice of a teaching minor may be made only with the approval of the Head of the Department of Health and Physical Education.

Upon completion of the prescribed curriculum and recommendation to the Texas Education Agency, the student will be eligible for (1) the All-Grade Level Certificate in Health and Physical Education and (2) Secondary School Certificate.

### Corrective Therapy

This program is offered in cooperation with the Veterans Administration to prepare specialists in rehabilitation through corrective therapy. This program includes a six-week clinical training period at the Veterans Administration Hospital in Houston. Graduates of this program may be employed by the Veterans Administration, private hospitals, or other organizations concerned with physical rehabilitation.

## Curriculum in
## PHYSICAL EDUCATION

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**[1]<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Science**[2] | (3-3) | 4 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 219**<br>Mammalian Anatomy | (2-3) | 3 | **Biology 220**<br>Physiology and Hygiene | (2-3) | 3 |
| **Biology 225**<br>Personal and Public Health | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Physical Education 211**<br>Physical Education Activities | (1-3) | 2 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 | **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 | **Physical Education 325**<br>Outdoor Activities | (2-0) | 2 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 | **Health Education 218**<br>Athletic Injuries | (1-3) | 2 |
| **Physical Education 316**<br>Secondary School Physical Education | (3-0) | 3 | **Health Education 421**<br>Elementary School Health Education | (3-0) | 3 |
| **Physical Education 427**<br>Remedial Exercises | (3-0) | 3 | **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 | **Psychology 307**<br>Child Growth and Development | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 6 |
| | | 18 | | | 17 |

### SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Education (elective)**[3] | (3-0) | 3 | **Physical Education 423**<br>Administration of Health and Physical Education | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Physical Education 425**<br>Tests and Measurements | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 | **Physical Education 450**<br>Directed Teaching | (2-12) | 6 |
| **Elective** | | 10 | **Elective** | | 3 |
| | | 18 | | | 15 |

NOTES: 1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the student's capabilities in mathematics. Mathematics 101 does not carry degree credit.

2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. Electives in Education may be chosen from any one of the following: Education 421, 427, 437.
4. History 325, 326 may be substituted for History 105, 106.

## SCIENCE

Science programs in the School of Arts and Sciences are administered by the following departments: Biology, Chemistry, Oceanography and Meteorology, and Physics.

The several curricula in science are planned for those students whose interests and abilities lie in the direction of seeking scientific truths and relations previously unknown or not understood in the world about us and of bringing these truths to bear on problems affecting the well-being of mankind. Because many students do not discover the nature of their interests or abilities until they have followed a curriculum in agriculture or engineering for a year or more, the curricula in science are so arranged that a student may change to science with a minimum of loss in semester hour credit.

The curricula are designed to serve the following purposes:

1. To prepare students for research in basic science, usually after further study at the graduate level.
2. To prepare teachers of science in secondary schools and other institutions of learning.
3. To provide the necessary undergraduate foundation for students planning to study medicine or kindred fields.
4. To afford a broad scientific training for students who desire it before entering some field of applied science in industry or government service.

## Curricula in
## BIOLOGICAL SCIENCES

### FRESHMAN YEAR

(For Majors in Botany, Entomology, Microbiology, and Zoology)

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit.

## For a Major in BOTANY

### FRESHMAN YEAR

(See page 147)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Botany elective)** | | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 5 |
| | | 17 |

## For a Major in ENTOMOLOGY

### FRESHMAN YEAR

(See page 147)

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 | **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Elective** | | 3 | **Modern Language**[1] | (3-0) | 3 |
| | | 16 | **Elective** | | 2 |
| | | | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Entomology 402**<br>Agricultural Pests | (2-3) | 3 |
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 | **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 4 |
| | | 17 | | | 17 |

NOTES: 1. See "The Foreign Language Requirement", page 125.
2. Science electives should usually be selected from the following courses:

| | | | | | |
|---|---|---|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 | **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 | **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 | | | |

## For a Major in MICROBIOLOGY

### FRESHMAN YEAR

(See page 147)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology (Microbiology elective)**[1] | | 4 | **Biology (Microbiology elective)**[1] | | 4 |
| **Chemistry 228** | (3-3) | 4 | **Chemistry 317** | (2-6) | 4 |
| Organic Chemistry | | | Quantitative Analysis | | |
| **Government 306** | (3-0) | 3 | **Liberal Arts**[2] | | 3 |
| American National Government | | | **Modern Language** | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | French, German, or Russian | | |
| French, German, or Russian | | | **Elective** | | 3 |
| **Elective** | | 3 | | | |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 312** | (3-6) | 5 | **Biology 482** | (1-0) | 1 |
| Veterinary Physiological Chemistry | | | Seminar in Biology | | |
| **Biology 481** | (1-0) | 1 | **Biology (Microbiology elective)**[1] | | 4 |
| Seminar in Biology | | | **English 403** | (1-2) | 2 |
| **Biology (Microbiology elective)**[1] | | 4 | Speaking for Professional Men | | |
| **Modern Language** | (3-0) | 3 | **Genetics 301** | (3-2) | 4 |
| French, German, or Russian | | | Genetics | | |
| **Elective** | | 3 | **Modern Language** | (3-0) | 3 |
| | | 16 | French, German, or Russian | | |
| | | | **Elective** | | 3 |
| | | | | | 17 |

NOTES: 1. Microbiology electives may be satisfied by Biochemistry and Nutrition 430; Biology 327, 353, 433, 438, 457, 608, 630, 647; Dairy Science 320, 326; Genetics 406; Plant Physiology and Pathology 314. Selections should be made with the aid of the student's advisor.

2. Liberal Arts elective may be satisfied by Liberal Arts 301, 304, or 201 and 311.

## For a Major in ZOOLOGY

## FRESHMAN YEAR
(See page 147)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101** | (2-3) | 3 | **Biology 206** | (2-4) | 3 |
| General Botany of Seed Plants | | | Introductory Microbiology | | |
| **Biology 217** | (2-4) | 3 | **Biology 218** | (2-4) | 3 |
| Comparative Anatomy of Vertebrates | | | Comparative Anatomy of Vertebrates | | |
| **English 212** | (3-0) | 3 | **English 231 or 232** | (3-0) | 3 |
| Shakespeare | | | Survey of English Literature | | |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201** | (3-3) | 4 | **Physics 202** | (3-3) | 4 |
| College Physics | | | College Physics | | |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (Zoology elective)** | | 3 | **Biology (Zoology elective)** | | 3 |
| **Chemistry 227** | (3-3) | 4 | **Chemistry 228** | (3-3) | 4 |
| Organic Chemistry | | | Organic Chemistry | | |
| **Genetics 301** | (3-2) | 4 | **Government 306** | (3-0) | 3 |
| Genetics | | | American National Government | | |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 4 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 | **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 | **Biology (Zoology elective)** | | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Elective** | | 12 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | | | 17 |
| **Elective** | | 7 | | | |
| | | 17 | | | |

NOTES: 1. See "The Foreign Language Requirement", page 125.

2. The elective hours in Zoology must include 12 hours chosen from the following courses: Biology 343, 344, 422, 433, 434, 435, 436.

3. Elective hours and the remaining hours required for the major should be selected from the following:

| Course | | Credit |
|---|---|---|
| ***Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| ***Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 304**<br>Plant Breeding | (3-2) | 4 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Genetics 406**<br>Biometry—Experimental Technique | (2-3) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology | (2-3) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |

## Studies Preparatory to
## MEDICINE, DENTISTRY, AND RELATED FIELDS
### Premedical and Predental Program

Students planning to enter a school of medicine or dentistry without first taking a college degree should matriculate in the curriculum in science and take the following program:

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

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*Strongly recommended for all zoology majors.

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (elective)** | | 3 | **Biology (elective)** | | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **Elective** | | 4 |
| | | 19 | | | 19 |

NOTES: 1. Most students admitted to medical and dental schools in the United States have three or more years of pre-professional training. A large proportion hold college degrees. It is therefore recommended that students preparing to enter medical or dental schools plan to complete at least the foregoing three-year program.

2. Four years of college work with the receipt of the baccalaureate degree is the preferred preparation for medical and dental schools. Majors may be obtained in zoology (see page 150) or chemistry (see page 153), and also in physics, microbiology, history, English, and other subjects so long as the requirements for entrance to the professional school are satisfied.

3. A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum here and at least one year at a Class A medical school or dental school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

4. Since courses in literature, language, history, and social sciences are not offered in medical or dental schools, leaders in medical education urge prospective medical and dental students to include much of such work in their preprofessional education. Some electives for the junior and senior years in line with this recommendation are:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Rural Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 | | | |

Electives available in the sciences related to medicine are:

| Course | | Hours | Credit |
|---|---|---|---|
| **Biochemistry and Nutrition 410** | Introductory Biochemistry | (3-3) | 4 |
| **Biology 206** | Introductory Microbiology | (2-4) | 3 |
| **Biology 343** | Histology | (2-3) | 3 |
| **Biology 344** | Embryology | (2-3) | 3 |
| **Biology 422** | Microtechnique | (1-6) | 3 |
| **Biology 433** | General Physiology | (3-3) | 4 |
| **Biology 434** | Circulatory and Nerve Physiology | (2-3) | 3 |
| **Biology 435** | Advanced Invertebrate Zoology | (3-3) | 4 |
| **Biology 436** | Animal Parasitology | (3-3) | 4 |
| **Biology 457** | Bacterial Ecology | (2-6) | 4 |
| **Biology 481** | Seminar in Biology | (1-0) | 1 |
| **Biology 482** | Seminar in Biology | (1-0) | 1 |
| **Chemistry 317** | Quantitative Analysis | (2-6) | 4 |
| **Civil Engineering 406** | Sanitation and Public Health | (3-0) | 3 |
| **Genetics 301** | Genetics | (3-2) | 4 |
| **Physics 310** | Applications of Modern Physics | (2-2) | 3 |

## Curricula in
## PHYSICAL SCIENCES

(For Majors in Chemistry, Meteorology, and Physics)

### FRESHMAN YEAR

| First Semester | | | Credit |
|---|---|---|---|
| **Chemistry 101** | General Chemistry | (3-3) | 4 |
| **English 103** | Composition and Rhetoric | (3-0) | 3 |
| **History 105** | History of the United States | (3-0) | 3 |
| **Mathematics 102** | Algebra | (3-0) | 3 |
| **Mathematics 103** | Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | | (0-3) | 1 |
| **Physical Education 101** | | (0-2) | R |
| | | | 17 |

| Second Semester | | | Credit |
|---|---|---|---|
| **Chemistry 102** | General Chemistry | (3-3) | 4 |
| **English 104** | Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 120** | Analytic Geometry and Calculus | (5-0) | 5 |
| **Military or Air Science** | | (0-3) | 1 |
| **Physics 218** | Mechanics and Heat | (3-3) | 4 |
| **Physical Education 102** | | (0-2) | R |
| | | | 17 |

## For a Major in
## CHEMISTRY

### For classes graduating in 1962-63 and thereafter

### FRESHMAN YEAR

(See above)

### SOPHOMORE YEAR

| | | | |
|---|---|---|---|
| **Biology 115** | Survey of Biology | (3-3) | 4 |
| **Chemistry 226** | Chemical Calculations | (2-0) | 2 |
| **Chemistry 227** | Organic Chemistry | (3-3) | 4 |
| **Mathematics 210** | Calculus | (3-0) | 3 |
| **Military or Air Science** | | (0-3) | 1 |
| **Physics 219** | Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | | (0-2) | R |
| | | | 18 |

| | | | |
|---|---|---|---|
| **Chemistry 228** | Organic Chemistry | (3-3) | 4 |
| **English 210** | Introduction to Logical Discourse | (2-0) | 2 |
| **History 106** | History of the United States | (3-0) | 3 |
| **Mathematics 307** | Calculus | (3-0) | 3 |
| **Military or Air Science** | | (0-3) | 1 |
| **Physics 220** | Modern Physics | (3-3) | 4 |
| **Physical Education 202** | | (0-2) | R |
| | | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 380**<br>Chemical Bibliography | (1-0) | 1 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Elective** | | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| | | 17 | **Elective** | | 3 |
| | | | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Analysis | (2-6) | 4 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 2 | | | 16 |
| | | 18 | | | |

## For the class graduating in 1961-62

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 380**<br>Chemical Bibliography | (1-0) | 1 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 5 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Analysis | (2-6) | 4 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 7 |
| **Elective** | | 2 | | | 17 |
| | | 18 | | | |

### For the class graduating in 1960-61

### SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 400**<br>Instrumental Methods of Analysis | (2-3) | 3 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 5 |
| | | 18 | | | 16 |

NOTES: 1. See "The Foreign Language Requirement", page 125.

2. A program combining the basic requirements for a Bachelor of Science degree in Chemistry with premedical requirements is available. Students completing this four-year program will receive a degree certified by the American Chemical Society and at the same time satisfy all the premedical requirements. Mimeographed copies of this program are available at the Department of Chemistry and from the Chairman of the College Premedical Committee in the Department of Biology.

## For a Major in
## METEOROLOGY

Meteorology is the science of the atmosphere and all its phenomena. One of the broad fields of geophysics, it is concerned with physical states and processes within the atmosphere and at the earth's surface. The objective of meteorology is to determine the natural and physical controls of the atmosphere and to apply this knowledge in various ways benefiting life and human endeavor.

Weather and climate through the ages have shaped the physical and biological features of the earth and have guided the course of human activities. However, it is only through quite recent developments in technology communications, and transportation that sufficient information has been obtained about the atmosphere to enable meteorology to emerge as a separate college study. While satisfying public interest in the weather has been the major object in meteorology, the last few years have witnessed rapidly expanding applications in agriculture, engineering, industry, business, commerce, and national defense.

### For classes entering in September 1958 and thereafter

### FRESHMAN YEAR

(See page 153)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Biology 330**<br>Life Science | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Modern Language** | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Elective** | | 1 | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 337**<br>Organic Evolution | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Meteorology 317**<br>Meteorological Instruments, Observations, and Communications | (2-3) | 3 |
| **Meteorology 325**<br>Physical Climatology | (3-0) | 3 |
| **Meteorology 335**<br>Atmospherics Statics and Thermodynamics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Meteorology 318**<br>Meteorological Instruments, Observations, and Communications | (1-3) | 2 |
| **Meteorology 326**<br>Regional Climatology | (2-0) | 2 |
| **Meteorology 336**<br>Atmospheric Motions | (3-3) | 4 |
| **Technical Elective** | | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 |
| **Meteorology 457**<br>Fundamentals of Weather Analysis | (1-12) | 5 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Meteorology 458**<br>Weather Analysis | (1-12) | 5 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Technical Elective** | | 4 |
| **Elective** | | 3 |
| | | 17 |

## Technical Electives for METEOROLOGY

| | | |
|---|---|---|
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |

### For the class graduating in 1961

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 |
| **Meteorology 457**<br>Fundamentals of Weather Analysis | (1-12) | 5 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Meteorology 458**<br>Weather Analysis | (1-12) | 5 |
| **Elective** | | 7 |
| | | 17 |

## OCEANOGRAPHY

Oceanography is the study of the oceans and their boundaries. It is based upon the unity of the sciences of the sea. Effective study of the subject requires thorough previous training in one of the pertinent basic sciences such as biology, chemistry, geology, mathematics, meteorology, and physics, or in engineering. Therefore, much of the work in oceanography is conducted at the graduate level, and the undergraduate program of students who wish to study oceanography must be planned to satisfy certain prerequisite requirements. It is suggested that such students consult regularly during their undergraduate years with the oceanography staff.

Five options, the biological, chemical, geological, physical, and meteorological with their corresponding engineering phases, are offered. The options require different undergraduate programs. These programs are taken in other departments except in the case of meteorological oceanography, where a complete undergraduate program in meteorology is offered in the Oceanography and Meteorology Department.

In the graduate program there are curricula leading to the Master of Science and Doctor of Philosophy degrees in each of the five options in oceanography. Specific prerequisite requirements are set up for each curriculum. In general, these consist of the courses normally required for the degree of Bachelor of Science in one of the basic fields listed above and some course work in each of the other fields.

Oceanography may be utilized in solving certain problems arising in fisheries work, offshore oil and gas operations, navigation, prevention of beach erosion, weather forecasting, recreation, extraction of raw materials from the sea, marine construction, coastal sanitation, military operations, fresh water supply, and many other activities. It requires broad interests, numerous skills, a real liking for the sea, and an adaptability to shipboard life.

## For a Major in
## PHYSICS

Physics is the science of energy and the interaction of energy and matter. Some physicists are primarily concerned with the discovery and investigation of effects and relations in the physical universe previously unknown or not understood. Others, known as applied physicists, are interested in bringing to the solution of industrial and technical problems, physical effects not previously so applied. When new and better ways are required to obtain and transmit energy or to alter the configuration or constitution of matter, physicists are of service.

Many branches of industry are seeking applied physicists with all levels of professional training from the Bachelor's to the Doctor's degree. Industrial and government-operated research laboratories and colleges and universites are seeking investigators of new physical truths and relations, with professional training beyond the Bachelor's degree. College graduates in physics are far short of the number needed.

The undergraduate curriculum in physics offers a thorough coverage of the phenomena of classical, atomic, and nuclear physics, while developing the student's mathematical tools to the point where he can deal resourcefully and constructively with these phenomena. It also provides a grounding in related sciences, linguistic techniques, and general education. Elective time permits further broadening of the student's education or a degree of concentration in some phases of engineering.

### For classes entering in September 1958 and thereafter

### FRESHMAN YEAR

(See page 153)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 16 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Modern Language[1]** | (3-0) | 3 | **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Physics 301**<br>Heat | (3-3) | 4 | **Modern Language[1]** | (3-0) | 3 |
| **Physics 401**<br>Optics | (3-3) | 4 | **Physics 302**<br>Mechanical Properties of Matter | (2-3) | 3 |
| **Elective[2]** | | 4 | **Physics 413**<br>Electricity and Magnetism | (2-3) | 3 |
| | | | **Elective[2]** | | 3 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Physics 311**<br>Atomic and Nuclear Physics | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 | **Physics 312**<br>Atomic and Nuclear Physics | (2-3) | 3 |
| **Physics 414**<br>Electricity and Magnetism | (1-3) | 2 | **Physics 416**<br>Electromagnetic Fields | (3-0) | 3 |
| **Elective[2]** | | 6 | **Elective[2]** | | 6 |
| | | 17 | | | 17 |

## For the class graduating in 1960-61

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 | **Physics 411**<br>Experimental Modern Physics | (0-6) | 2 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 | **Physics 414**<br>Electricity and Magnetism | (1-3) | 2 |
| **Physics 413**<br>Electricity and Magnetism | (2-3) | 3 | **Physics 416**<br>Electromagnetic Fields | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 5 |
| | | 18 | | | 17 |

NOTES:

1. See "The Foreign Language Requirement", page 125. German or Russian is recommended normally.

2. Electives should be selected in consultation with, and on approval of, the Head of the Department with two objectives in view: (1) to strengthen the broad foundation expected of students who specialize in physics; (2) to intensify the student's program in the direction of a specific competence. For objective (1) are recommended electives in other sciences, especially chemistry; electives in basic engineering courses, such as DC and AC machinery, circuit theory, electronics, engineering mechanics, mechanics of materials, thermodynamics, engineering drawing (Engineering Drawing 105), and machine shop (Mechanical Engineering 309); and electives in mathematics, languages, the humanities, and social sciences.
   Objective (2) is determined by the student's interests and plans for the future. He may aspire to a career of advancing knowledge of fundamental physics through basic research on physical phenomena or through college teaching. In this case the student must plan on postgraduate study and should choose his electives to increase his intellectual equipment in mathematics and to widen his range of acquaintance with subjects in physics and other sciences and fields important for an educated man. If the student is interested in research in physics bearing on a field of some other science, such as chemistry, geology, meteorology, oceanography, or biology, a heavy concentration of electives should be made in that science. The student preparing for a career in high school teaching should elect the requisite courses in education. A student planning to go directly into industry upon graduation should concentrate a large portion of his electives in a sequence of courses proceeding to an advanced stage in, for instance, aeronautical engineering, communications and electronics in electrical engineering, or vibrations and the mechanics of materials, or thermodynamics and heat transfer in mechanical engineering.

# THE SCHOOL OF ENGINEERING

## GENERAL STATEMENT

In recent years the field of engineering has become of great importance in our way of life. Through its various curricula, the School of Engineering offers broad programs of education in the fundamental physical and engineering sciences designed to develop the student's abilities and qualities that will enable him to enter into and advance with the profession of engineering and to be a happy and responsible citizen. In addition to the scientific and mathematical training, subject matter in the social and humanistic areas is included. The student who conscientiously applies himself and successfully completes one of these broad engineering programs will be not only technically trained but also humanly and socially educated.

A student who is considering a career in engineering should realize that these curricula are highly technical in character and require a minimum of four years of intensive study in mathematics and science. Laboratory work, problem courses, and some practice courses are included so that the student may learn more readily how to apply fundamental principles to solve problems in engineering. All curricula are intended to develop professional engineers prepared for research, design, testing, maintenance, operation, or management of engineering projects. The particular place of industrial education, including the industrial technology option, is explained in the subsequent description of the Department of Industrial Education.

For the high school graduate, the minimum requirements for college entrance are listed in the earlier pages of this bulletin. For students who are still in high school and who are in a position to plan their high school program in preparation for engineering, the importance of mathematics and science cannot be overemphasized. A good high school background in mathematics would include two years of algebra, one year of plane geometry, one-half year of solid geometry, and one-half year of trigonometry. Also, a student should take as much natural science as possible in high school. Of the natural sciences, chemistry and physics are of particular importance in the preparation for the study of engineering.

## CURRICULA

### Four-Year Curricula

Each of the following curricula leads to the Bachelor of Science degree and requires a normal period of four years for completion:

Aeronautical Engineering
*Agricultural Engineering
Chemical Engineering
Civil Engineering
Electrical Engineering
Geological Engineering
Geology
Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Petroleum Engineering

### Five-Year Curricula

The following five-year programs lead to the Bachelor of Architecture and Bachelor of Petroleum Engineering degrees respectively:

Architecture (Design Option)
Petroleum Engineering

The five-year curriculum in Architecture (Construction Option) leads to the degree of Bachelor of Science in Architectural Construction.

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*Administered jointly by Schools of Agriculture and Engineering.

### Five-Year Combined Degree Plans

Students who are interested in two areas of engineering or a business foundation to complement their engineering curriculum may pursue programs which lead to two Bachelor's degrees in five years. The following curricula are examples; students interested in other possible combinations should consult with the Dean of Engineering:

Chemical Engineering—General Business
Civil Engineering—General Business
Geology—Petroleum Engineering
*Industrial Engineering
Petroleum Engineering—General Business
Petroleum Engineering—Chemical Engineering
Petroleum Engineering—Geological Engineering
Petroleum Engineering—Mechanical Engineering

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees, the Bachelor of Science degree in a professional field and the Bachelor of Arts degree in one of the liberal arts curricula such as English (See page 53, "Two Degrees"). Other combinations are available such as a five-year combined program in the various industrial education options and journalism, which prepares the student to become an industrial journalist.

## NUCLEAR PROGRAM

The College now offers Master of Science and Ph.D. degrees in Nuclear Engineering. An explanation of these plans appears under advanced study.

## ADVANCED STUDY

As the knowledge required for advanced engineering design in industry increases, more and more students are finding it desirable to go beyond the usual four-year course in college. Much of the design in industry today follows the research mode of procedure, the procedure predominantly used in graduate study. Consequently, there has been a growth in graduate study to satisfy the demands of industry for engineers with greater scientific knowledge and research ability. In the future, industry, colleges, and governmental agencies will carry on more and more research, and, therefore, there will continue to be a great demand for engineers with graduate training through the doctorate. It should be pointed out, however, that graduate study is available only to those with more than average ability.

Students who are interested in pursuing one of the above graduate programs should take the regular undergraduate program in Aeronautical Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Petroleum Engineering, Chemistry, Mathematics, or Physics. The following are recommended as electives for the undergraduate program, with the most important listed first. These courses should be taken only after consultation with the head of the student's major department.

| | |
|---|---|
| Physics 311 | Atomic and Nuclear Physics |
| Physics 312 | Atomic and Nuclear Physics |
| Nuclear Engineering 401 | Nuclear Engineering |
| Nuclear Engineering 402 | Industrial Applications of Radioisotopes |

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*A degree of Bachelor of Science in Industrial Engineering may be awarded on the basis of the student's completing the requirements for the degree of Bachelor of Science in Aeronautical, Chemical, Civil, Electrical, Mechanical, or Petroleum Engineering and additional required courses.

An AGN-201 Nuclear Training Reactor is available for use in the nuclear technology work. In the fall of 1960 the 5 megawatt research reactor in the A. and M. Nuclear Science Center will become available for student training and research.

Prospective graduate students should write to the Director of Admissions for a Graduate School Catalogue.

## AERONAUTICAL ENGINEERING

Aeronautical engineering is described as the technical activities associated with the development of aircraft and missiles. These include research, analysis, and design in several technical specialties such as aerodynamics, dynamics of aircraft, structures, properties of materials and propulsion.

Aeronautical engineering graduates are employed in air-frame manufacturing companies, government research laboratories, and equipment manufacturing companies in Texas and elsewhere. A considerable number enter the military services as engineering officers. Aeronautical engineering graduates are also well qualified for positions in other fields of engineering, since men trained in aerodynamics and the design of high-strength, light-weight structures are in demand in many industries.

The Aeronautical Engineering Department has excellent facilities in the new Engineering Building on the campus and at the College-owned Easterwood Airport. Facilities on the campus include a supersonic wind tunnel, an instructional low-speed wind tunnel, a structures laboratory, a materials and process laboratory, and complete shop facilities. The Aeronautical Laboratories, including the large wind tunnel, are located at Easterwood Airport.

The four-year undergraduate curriculum in aeronautical engineering leading to the degree of Bachelor of Science includes sound preparation in mathematics, physics, chemistry, English, and mechanics. The junior and senior years are devoted largely to the professional courses in aerodynamics, aircraft structures, aircraft power plants, and aircraft design. The opportunity to elect courses in a desired specialty is provided in the senior year.

## AGRICULTURAL ENGINEERING

See page 92 for a discussion of this curriculum.

## ARCHITECTURE

The Division of Architecture offers a program designed to provide young men with a broad and balanced background of fundamental training for professional careers in the design and construction of buildings. The students are encouraged to develop sensibly and to apply their acquired fundamental knowledge and skills to the solutions of social and architectural problems of contemporary society. While they must develop the capacity to analyze, plan, and organize space to serve the needs and welfare of man, they must supplement this with full recognition of their professional responsibilities to an individual as well as to his community.

Architectural design is taught in a series of stages defined in the courses of instruction. The students are assigned problems to be solved individually varying in length and scope. Individual guidance and criticism are given by the instructor accompanied with direction in the use of reference material in the library. The curriculum for the first two years is designed to give the student fundamental training in the techniques of drafting and an appreciation and understanding of the elementary principles of design and construction. The work of the last three years is built around more comprehensive problems of architecture.

Two options are offered: the Design Option and the Construction Option. The program is the same during the first year. This makes it possible for the student to defer his decision until the beginning of his sophomore year, when he can more intelligently select his course of study. Both options are five-year courses. The Design Option leads to the degree of Bachelor of Architecture; the Construction Option, to the degree of Bachelor of Science in Architectural Construction.

While the programs are designed primarily to prepare young men for professional careers in architecture and building construction, the training forms a good foundation for those who may wish to enter other fields. Graduates find their way into the profession as draftsmen, designers, estimators, superintendents of construction, and develop careers as architects, contractors, and city and regional planners.

The Division of Architecture is a member of the Association of Collegiate Schools of Architecture, is on the approved list of schools accepted by the Texas Board of Architectural Examiners, and is accredited by the National Architectural Accrediting Board.

## CHEMICAL ENGINEERING

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a coordinated series of unit physical operations and unit chemical processes. The work of the chemical engineer is concerned primarily with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineering became a separate division of engineering with the growth of strictly chemical industries, and it is now recognized as one of the important divisions of engineering, dealing with combustion of fuels, heat treatment of metals and alloys, the preparation of water for potable and industrial use, the refining of petroleum, processing of vegetable oils, the development of electric furnace products, portland cement, lime gypsum, plaster, heavy chemicals, soaps, rubber, corn products, textiles, paper, artificial leather and silks, food products, and other products.

The work of the chemical engineer is the changing of raw materials into finished products with the greatest efficiency and economy. He substitutes a rigid control of processes for guess work and uncertainty and increases the productivity of labor by supplying more efficient processes where the standard and quality of the finished product are revised and the amount of seconds and rejections is reduced. The chemical engineer must also be able to modify a process in order to adapt it to commercial conditions and to select his material for construction with special reference to its use. His work is distinct from that of the chemist on the one hand and the mechanical engineer on the other, though he must have a thorough training in both chemistry and engineering.

The curriculum in chemical engineering is planned to prepare students for the design, construction, and operation of industries in which materials undergo chemical and physical change. The unit operations, such as fluid flow, heat flow, evaporation, drying, distillation, gas absorption, filtration, crushing and grinding, and size separation are basic studies that may be applied to any industry. General chemical processes are also included in the laboratory and classroom work. Research in both of these divisions is fostered by cooperative projects with the Texas Engineering Experiment Station and industrial organizations of the State.

As chemical engineering treats of the processes whereby materials undergo a chemical and physical change, it is apparent that a large number of diversified industries have use for the chemical engineer, not only in the operation and control of processes but in the design of special equipment. Many chemical engineers enter the research laboratory, investigating processes in the laboratory and supervising their operation in the plants, considering carefully the controlling interest of cost as a factor in all industrial operations.

## CIVIL ENGINEERING

The curriculum in civil engineering has for its objective the thorough grounding of young men in the underlying principles of the basic sciences and engineering. Training or practice in the art of applying these principles to problems encountered in practice is given in the drafting room, laboratories, and in the field so as to enable the graduate to give satisfactory service in an engineering organization immediately upon graduation.

During the first three years the subject matter of the courses is common to all phases of civil engineering, such as surveying, highway engineering, mechanics, strength of materials, hydraulics, and stress analysis. In the fourth year the student is given an opportunity to specialize moderately in structural engineering, highway engineering, hydraulic engineering, or municipal and sanitary engineering. In addition, courses in cost estimating and engineering economy are required of all the students to give them an understanding of the importance of these matters in the practice of civil engineering. Students who are interested in construction engineering should consider the possibility of obtaining a Bachelor of Science degree in Civil Engineering and a Bachelor of Business Administration degree. Copies of a degree plan to satisfy the requirements for both degrees may be obtained from the Civil Engineering Department.

The moderate specialization indicated above does not restrict the student to securing employment in a special field. The curriculum is so planned as to make it possible for him to undertake professional practice embracing the following: surveying; water supply; sewerage; the planning, design, and construction of buildings, bridges, earthen dams, reservoirs, canals, and the conventional types of foundations required for all of the structures; planning, design, construction, and maintenance of roads and highways; traffic engineering; planning and execution of sanitary measures for rural and urban communities; administration of city business as city manager; industrial, academic, and governmental research of civil engineering matters; and technical service of various kinds leading to executive positions in industry.

## ELECTRICAL ENGINEERING

The curriculum in electrical engineering is designed to give the student thorough training in the principles on which electrical phenomena are based. Instruction is provided in the basic sciences and mathematics that serve as the foundation for an engineering career.

The program for the first two years includes mathematics, physics, chemistry, and electrical science together with courses in English, history, economics, and other social and humanistic studies. The third year is devoted largely to the engineering sciences that are appropriate to all fields of electrical engineering. The program in the fourth year consists of studies of a professional nature illustrating the applications of engineering principles to typical problems in the fields of electronics, machinery, and communications. Elective courses in the fourth year permit the student to develop his interest in some particular field of electrical engineering.

Electrical engineering offers many opportunities to young men with suitable training. Graduates presently find employment in the aircraft and missile industry, public utilities, the petroleum industry, communications, and with electrical and electronic manufacturers. Electrical engineering education provides the necessary background for research, design and development, operations, management, and sales in the several industries in which electrical engineers work.

Students who expect to enroll in electrical engineering after attending another college should note that there is a six-semester sequence of electrical engineering courses in the curriculum. If the prerequisites are satisfied, transfer students may complete this sequence in two years and one summer session and should plan to transfer at the beginning of the summer session.

Student branches of the Institute of Radio Engineers and the American Institute of Electrical Engineers have been organized on the campus, and membership in one or both of these organizations serves to keep the student informed about current developments in the field of electrical engineering.

## GEOLOGY

Training in geology is designed to prepare the student in the fundamentals of the earth sciences. These include the study of rocks, minerals, fossils, earth structures, the physical features of the earth's surface, and the economic application of this knowledge.

This curriculum is designed for the student who approaches geology as a science, with the inherent obligation of exploring, observing, analyzing, inquiring, classifying, describing, and finally interpreting the record and the content of the rocks. It is based upon the related sciences of chemistry, physics, mathematics, and biology. It prepares a man either for general geological investigations or for graduate study in geology in a normal period of four years.

## GEOLOGICAL ENGINEERING

The curriculum in geological engineering provides training in the fundamental principles of engineering as well as specialized training in geology in a normal period of four years. Although this course is designed primarily for the student who expects to be employed as a petroleum geologist, the curriculum is such that the graduate is also qualified for work with railroads, public utilities, construction, ceramics, and other industries in which a knowledge of both geology and engineering is desirable.

## GEOPHYSICS

This curriculum is designed to prepare students to investigate geologic features with physical measurements. The objective is to gain skill in geologic interpretations of data obtained with such measurements. It is concerned primarily with a fundamental understanding of geology, and secondly with mathematics, physics, and electrical engineering. The curriculum prepares a student either for general geological or geophysical investigations, or for graduate study in either of these subjects in a normal period of four years.

## INDUSTRIAL EDUCATION

This department has several options which prepare students for teaching positions and for employment in industry. These several options are described below.

### Industrial Arts Teacher Education

This curriculum prepares young men to teach industrial arts in the junior or senior high schools or in technical schools. The students completing this four-year program receive the Bachelor of Science degree and are qualified to receive the appropriate teaching certificate from the Texas Education Agency. Industrial arts includes such areas as general shop, electricity, metals, woodworking, drafting, plastics, ceramics, leather, and other craft courses. The students may also qualify in this program for a certificate to teach driver training in the public schools.

### Vocational Industrial Teacher Education

This program is designed for teachers, supervisors, and directors of vocational educational schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, the candidate must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan.

### Industrial Technology

The curriculum in industrial technology is planned to prepare young men for positions in industry pertaining to safety, supervision, production, and employee training. Students pursuing this pattern must take the technical electives as indicated on page 186.

### Industrial Distribution

This is a four-year program which prepares for industrial technical sales (Industrial Distribution). The demand for graduates with technical sales potential is increasing annually and employment opportunities are plentiful at this time. Those pursuing this pattern should take the technical electives as indicated on page 186.

## INDUSTRIAL ENGINEERING

Industrial engineering is the science of production. Just as the other branches of engineering use the laws of the physical sciences in the design and operation of a product, so does industrial engineering apply these same laws to the design, selection, and operation of the plant in which this product is produced. A major distinction between industrial engineering and other branches is that the industrial engineer must consider not only the behavior of inanimate objects as they are governed by physical laws, but also must include in his plan the behavior of people as they operate together in organizations, whether these organizations be simple or complex.

Although usually the industrial engineer is concerned with the production of a manufactured article, the same principles of scientific analysis, planning, and control which are effective in this field have been found to be quite useful in any activity where a large number of people work together. Thus, industrial engineers find employment in wholesale trade, in transportation, even in banks and insurance companies. Because of the increasing technical complexity of today's manufacturing operations, there is a rapidly increasing demand for men with engineering background to enter the field of factory design and operation.

### Four-Year Curriculum

The four-year curriculum leading to the Bachelor of Science degree in industrial engineering fills the above need by providing training in the basic engineering subjects of mathematics, physics, drawing, chemistry, and mechanics which are common to most engineering curricula. Beyond this, it gives students training in manufacturing processes, setting time standards, production control, quality control, tool engineering, cost analysis, factory design, industrial relations, and operations research. This combination well equips the graduate who plans to make his career that of production control and supervision.

### Five-Year Curriculum

Since there is an insistent and growing demand for men versed in the fundamentals of other branches of engineering and also in the fundamentals of executive control, there are offered five-year curricula designed for students who wish training in industrial and in aeronautical, chemical, civil, electrical, mechanical, or petroleum engineering. Thus, in five years the student may complete the requirements for two Bachelor of Science degrees, one in his preferred specialty of engineering and the other in the field of industrial engineering. The completion of the requirements for these two degrees should admirably prepare the engineering graduate for rapid advancement.

Students desiring to work toward the two degrees should consult with the Director of Admissions and Registrar or the Head of the Industrial Engineering Department for the course requirements. The industrial engineering courses may be taken either concurrently with courses in any of the above branches, which will enable the students to get both degrees at the same time, or may be taken after the first degree is granted. Ordinarily two semesters of additional work is sufficient to complete the requirements for the second degree in industrial engineering.

## MECHANICAL ENGINEERING

The breadth of the field of mechanical engineering is such that extensive specialization in undergraduate work is impossible and undesirable. Industry needs mechanical engineers for such a variety of work that it is deemed wise to make the curriculum broad and fundamental.

Training in habits of accurate analysis and logical thinking, the prerequisites of a good engineer, is emphasized.

Fundamental theory courses are supplemented by practice work in pattern shop, foundry, machine shop, welding, and experimentation. Practice courses are designed to instruct in methods rather than to develop extensive skills.

Some specialization is possible in that during the senior year the student may elect courses in such fields as air conditioning, automotive engineering, internal combustion engines, turbines, marine engineering, and metallurgy.

The work of practicing mechanical engineers varies from general engineering to highly specialized fields. The work logically falls under **design, construction and erection, operation and maintenance, research, administration, and sales.**

**Design engineers** may find their work to be that of original design of machines and associated equipment; design of operating assemblies of machines and equipment commercially available for desired manufacturing or process jobs; redesign of existing equipment to make possible changes, to improve economy, safety, and appearance.

**Construction and erection engineers** may be responsible for assembling and fabricating entire plants and putting them into operation. They must be able to use engineering drawings, plans and specifications, and to do supplementary design work.

**Operation and maintenance engineers** are in charge of plant performance and upkeep. They must be capable of securing profitable operation and of the supervision of plant personnel.

**Research engineers** are called on for an endless variety of investigations. They must have inquiring minds, initiative, patience, thorough knowledge of the fields in which they work, and the ability to analyze and correlate the results obtained. For the research man, graduate study is recommended.

Many engineers who have the leadership ability, personality, tact, and initiative become **administrators and executives.**

**Sales engineers** are probably as much in demand as any other group.

Among the industries that employ a large number of mechanical engineers are: air conditioning, aircraft, automotive, chemical, power, petroleum, refrigeration, and general manufacturing.

## PETROLEUM ENGINEERING

The curricula in petroleum engineering are intended to prepare students for the petroleum industry and particularly for those branches which have to do with drilling, production, and transportation of petroleum as well as with the natural gas industry.

Four courses in petroleum engineering are available to the students in this department: (1) a regular four-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Science; (2) a five-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Petroleum Engineering; (3) a five-year curriculum in petroleum engineering—geological engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Geological Engineering; (4) a five-year curriculum in petroleum engineering — mechanical engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering.

The four-year curriculum in petroleum engineering includes sufficient training in civil, mechanical, and electrical engineering to prepare the graduate for the application of engineering principles to the petroleum industry. Courses in geology give an understanding of the geological structures and conditions favorable for petroleum deposits. To the basic subjects are added courses in petroleum engineering which illustrate the application of engineering principles to the type of problems met in the petroleum industry and which also give some understanding of the technique of the industry. Emphasis is placed on thorough grounding in the fundamentals rather than on application to particular problems.

The five-year curriculum in petroleum engineering is designed to provide a broader educational background. This curriculum contains all the courses included in the four-year curriculum and courses in psychology, accounting, English, economics, business, geography, and advanced mathematics.

In addition to these specific degree programs, five-year combination degree curricula may be arranged, such as petroleum engineering—general business, petroleum engineering—chemical engineering, petroleum engineering —industrial engineering, or petroleum engineering—English for one desiring a broader educational background. Those desiring the five-year combination degree curricula in petroleum engineering and another field should contact the Head of the Petroleum Engineering Department for assistance in planning the course of study.

## PETROLEUM ENGINEERING— GEOLOGICAL ENGINEERING

The five-year petroleum engineering — geological engineering course includes all of the subjects given in the four-year petroleum engineering course and all of the subjects in the four-year geological engineering course. This combination five-year course is intended to give a student interested in geology a background in engineering and the application of geology and engineering to the petroleum industry.

## PETROLEUM ENGINEERING— MECHANICAL ENGINEERING

The five-year curriculum in petroleum engineering—mechanical engineering leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering. The scope of the work in the petroleum industry is so broad and so varied that it is desirable for the man who expects to enter this field to have a very comprehensive training. This course is designed to give such breadth of training by including the essential courses in both the petroleum and mechanical curricula. The production, transportation, and refining of oil involve the generation and utilization of power, the design and operation of mechanical equipment, the principles of heat transfer, and the handling of men and finances. Thus, a five-year curriculum combining the two courses was deemed desirable.

## Curricula in
## ARCHITECTURE AND ARCHITECTURAL CONSTRUCTION

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Military or Air Science** | (0-3) | 1 |
| | | 17 | **Physical Education 102** | (0-2) | R |
| | | | | | 17 |

### DESIGN OPTION

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 227**<br>Structural Principles | (3-0) | 3 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 301**<br>Design III | (0-15) | 5 | **Architecture 302**<br>Design III | (0-15) | 5 |
| **Architecture 305**<br>Graphic Art | (0-6) | 2 | **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 | **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Architecture 401**<br>Design IV | (0-15) | 5 | **Architecture 402**<br>Design IV | (0-15) | 5 |
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 | **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 |
| **Elective (Humanities)** | | 3 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 501**<br>Design V | (0-15) | 5 | **Architecture 502**<br>Design V | (0-15) | 5 |
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 556**<br>City Planning | (2-3) | 3 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Landscape Architecture 411**<br>Landscape Design for the Architect and Engineer | (2-2) | 3 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** | | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| | | 17 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | | | | 16 |

## CONSTRUCTION OPTION

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Geology 422**<br>Natural Structural Materials | (2-3) | 3 |
| | | 17 | | | 16 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 | **Business Administration 433**<br>Business Management | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 | **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Elective (Humanities)** | | 2 | **Elective (Humanities)** | | 2 |
| | | 17 | | | 17 |

## SUMMER WORK

Architecture 500; Summer practice, twelve weeks, required.

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 554**<br>Professional Practice | (2-0) | 2 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Elective** | | 10 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 | | | |
| **Elective (Humanities)** | | 3 | | | |
| | | 17 | | | 17 |

## Curricula in
## ENGINEERING

(With the exception of architecture, geology, and industrial education, all curricula in the School of Engineering are identical in the freshman year.)

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 | **Engineering Drawing 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | |
| | | 19 | | | 19 |

## Curriculum in AERONAUTICAL ENGINEERING

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Aeronautical Engineering 201**<br>Elementary Aerodynamics | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 | **Physical Education 202** | (0-2) | R |
| | | | | | 19 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 301**<br>Theoretical Aerodynamics | (3-0) | 3 | **Aeronautical Engineering 302**<br>Experimental Aerodynamics | (1-3) | 2 |
| **Aeronautical Engineering 304**<br>Elementary Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 303**<br>High Speed Aerodynamics | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Aeronautical Engineering 306**<br>Strength of Aircraft Materials | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 | **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| | | 16 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 401**<br>Aircraft Design | (2-6) | 4 | **Aeronautical Engineering 402**<br>Aircraft Design | (2-6) | 4 |
| **Aeronautical Engineering 405**<br>Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **Aeronautical Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 | **Aeronautical Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 17 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

## For the class graduating in 1960-61

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 401**<br>Aircraft Design | (2-6) | 4 | **Aeronautical Engineering 402**<br>Aircraft Design | (2-6) | 4 |
| **Aeronautical Engineering 403**<br>Aircraft Materials and Processes | (1-3) | 2 | **Aeronautical Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 |
| **Aeronautical Engineering 405**<br>Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 481**<br>Seminar | (1-0) | 1 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 | **Technical Elective** | | 6 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 19 | | | 18 |

## Technical Electives for AERONAUTICAL ENGINEERING

| Group A | | |
|---|---|---|
| **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | **(3-0)** | **3** |
| **Aeronautical Engineering 418**<br>Advanced Aerodynamics | **(4-0)** | **4** |
| **Aeronautical Engineering 421**<br>Dynamics of Airplanes | **(3-0)** | **3** |

| Group B | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | **(3-3)** | **4** |
| **Mathematics 308**<br>Differential Equations | **(3-0)** | **3** |
| **Mathematics 405**<br>Vector Analysis | **(3-0)** | **3** |
| **Mechanical Engineering 340**<br>Physical Metallurgy | **(2-3)** | **3** |
| **Nuclear Engineering 401**<br>Nuclear Engineering | **(3-0)** | **3** |

NOTE: At least one of the technical electives in the senior year must be selected from Group A.

## Curriculum in AGRICULTURAL ENGINEERING

(See page 112)

## Curriculum in CHEMICAL ENGINEERING

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | **(3-3)** | **4** |
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **History 106**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 210**<br>Calculus | **(3-0)** | **3** |
| **Mechanical Engineering 212**<br>Engineering Mechanics | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 219**<br>Sound, Light, Electricity | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **20** |

| Second Semester | | Credit |
|---|---|---|
| **Chemical Engineering 204**<br>Elementary Chemical Engineering | **(3-0)** | **3** |
| **Chemistry 228**<br>Organic Chemistry | **(3-3)** | **4** |
| **Civil Engineering 305**<br>Mechanics of Materials | **(3-0)** | **3** |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | **(0-2)** | **1** |
| **Mathematics 307**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 220**<br>Modern Physics | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **19** |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | **(3-0)** | **3** |
| **Chemistry 316**<br>Quantitative Analysis | **(2-6)** | **4** |
| **Chemistry 323**<br>Physical Chemistry | **(3-3)** | **4** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **Mechanical Engineering 327**<br>Thermodynamics | **(3-0)** | **3** |
| | | **17** |

| | | |
|---|---|---|
| **Chemical Engineering 314**<br>Unit Operations Laboratory | **(0-3)** | **1** |
| **Chemical Engineering 423**<br>Unit Operations | **(3-0)** | **3** |
| **Chemistry 317**<br>Quantitative Analysis | **(2-6)** | **4** |
| **Chemistry 324**<br>Physical Chemistry | **(3-3)** | **4** |
| **Mechanical Engineering 403**<br>Engineering Laboratory | **(1-3)** | **2** |
| **Elective (Humanities)** | | **3** |
| | | **17** |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemical Engineering 441**<br>Chemical Engineering Unit Processes | (3-0) | 3 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| | | 17 |

### For the class graduating in 1960-61

## SENIOR YEAR

| | | |
|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemical Engineering 441**<br>Chemical Engineering Unit Processes | (3-0) | 3 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Elective** | | 3 |
| | | 21 |

| | | |
|---|---|---|
| **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Elective** | | 3 |
| | | 19 |

## Curriculum in
## CIVIL ENGINEERING

## FRESHMAN YEAR
(See page 170)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## SUMMER WORK

Civil Engineering 300, Summer Surveying Practice, six weeks, credit 5

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 | **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 | **Civil Engineering 344**<br>Plain and Reinforced Concrete | (3-3) | 4 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 | **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 15 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 | **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 | **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 443**<br>Materials of Construction | (1-3) | 2 | **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | 17 | **Technical Elective** | | 3 |
| | | | | | 17 |

## For the class graduating in 1960-61

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 | **Civil Engineering 443**<br>Materials of Construction | (1-3) | 2 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 | **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **Civil Engineering 474**<br>Contracts and Specifications | (2-0) | 2 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 | **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Technical Elective** | | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Elective** | | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| | | 18 | **Technical Elective** | | 3 |
| | | | **Elective** | | 3 |
| | | | | | 18 |

## Technical Electives for CIVIL ENGINEERING

| (Offered in Fall Semester only) | | | (Offered in Spring Semester only) | | |
|---|---|---|---|---|---|
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 | **Civil Engineering 403**<br>Sanitary Design | (2-3) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 | **Civil Engineering 417**<br>Bituminous Materials | (2-3) | 3 |
| **Civil Engineering 457**<br>Traffic Engineering | (3-0) | 3 | **Civil Engineering 458**<br>Hydraulic Engineering | (3-0) | 3 |
| **Civil Engineering 463**<br>Hydrology | (3-0) | 3 | **Civil Engineering 470**<br>Aerial Photogrammetry | (2-3) | 3 |
| **Civil Engineering 468**<br>Statically Indeterminate Structures | (2-3) | 3 | **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Geology 441**<br>Advanced Engineering Geology | (3-3) | 4 | **Civil Engineering 486**<br>Design of Prestressed Concrete Structures | (2-3) | 3 |

NOTE: By proper choice of technical electives, civil engineering students may specialize to some extent in highway, hydraulic, structural, construction, or sanitary engineering.

## Curriculum in
## ELECTRICAL ENGINEERING

### For classes entering in September 1960 and thereafter

### FRESHMAN YEAR
(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Electrical Engineeering 214**<br>Electrical Circuit Theory | **(3-3)** | **4** |
| **Electrical Engineering 201**<br>Electricity and Magnetism | **(3-4)** | **4** | **Government 306**<br>American National Government | **(3-0)** | **3** |
| **History 106**<br>History of the United States | **(3-0)** | **3** | **Mathematics 307**<br>Calculus | **(3-0)** | **3** |
| **Mathematics 210**<br>Calculus | **(3-0)** | **3** | **Mechanical Engineering 212**<br>Engineering Mechanics | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Physics 219**<br>Sound, Light, Electricity | **(3-3)** | **4** | **Physics 220**<br>Modern Physics | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | 18 | | | 18 |

### SUMMER SESSION

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | **(9-0)** | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | **(9-0)** | 3 |
| | | 6 |

NOTE: Transfer students who have completed 68 acceptable credits of college work and lack no more than 14 credits of courses required in the sophomore year may attend both summer terms (12 weeks) and arrange a schedule to complete the degree program in four additional semesters. Such students should confer with the departmental advisor before enrolling in the summer session.

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | **(3-0)** | **3** | **Electrical Engineering 322**<br>Electric and Magnetic Fields | **(3-0)** | **3** |
| **Electrical Engineering 325**<br>Electronics | **(3-0)** | **3** | **Electrical Engineering 324**<br>Electrical Circuit Theory | **(3-0)** | **3** |
| **Electrical Engineering 327**<br>Electrical Laboratory | **(1-3)** | **2** | **Electrical Engineering 326**<br>Electronic Circuits | **(3-0)** | **3** |
| **English 231**[1]<br>Survey of English Literature | **(3-0)** | **3** | **Electrical Engineering 328**<br>Electrical Laboratory | **(1-3)** | **2** |
| **Mathematics 308**<br>Differential Equations | **(3-0)** | **3** | **English 232**[1]<br>Survey of English Literature | **(3-0)** | **3** |
| **Mechanical Engineering 327**<br>Thermodynamics | **(3-0)** | **3** | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | **(3-0)** | **3** |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | **(3-0)** | **3** | **Electrical Engineering 402**<br>Electrical Machinery | **(3-0)** | **3** |
| **Electrical Engineering 403**<br>Electrical Laboratory | **(0-6)** | **2** | **Electrical Engineering 404**<br>Electrical Laboratory | **(0-6)** | **2** |
| **Electrical Engineering 415**<br>Transmission Networks | **(2-2)** | **3** | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | **(3-0)** | **3** |
| **English 401**<br>Public Speaking | **(0-2)** | **1** | **Electrical Engineering 432**<br>Economic Phases of Engineering | **(2-0)** | **2** |
| **Mathematics 409**[2]<br>Advanced Calculus | **(3-0)** | **3** | **Elective**[3] | | **3** |
| **Technical Elective** | | **3** | **Technical Elective** | | **3** |
| | | 15 | | | 16 |

NOTES:
1. Any courses in English or American literature may be substituted for English 231 and 232.
2. Mathematics 405, 411, 414, or 415 may be substituted for Mathematics 409.
3. Any junior or senior course from Group I, Humanistic-Social Electives, page 198, may be chosen.

## For classes graduating in 1961-62 and 1962-63

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Electrical Engineering 201**<br>Electricity and Magnetism | (3-4) | 4 | **Electrical Engineering 315**<br>Alternating Currents | (3-3) | 4 |
| English 212[1]<br>Shakespeare | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **English 371**[1]<br>Great Books | (3-0) | 3 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 402**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 415**<br>Transmission Networks | (2-2) | 3 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Technical Elective** | | 3 |
| **Elective**[3] | | 3 | | | 17 |
| | | 17 | | | |

NOTES:
1. English 231 or 232 may be substituted for this course.
2. Mathematics 405, 411, 414, or 415 may be substituted for this course.
3. Any junior or senior course from Group I, Humanistic-Social Electives, page 198, or any one of the technical electives for electrical engineering may be selected.

## Technical Electives for ELECTRICAL ENGINEERING

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 406**<br>Electric Power Distribution and Transmission | (2-2) | 3 | **Electrical Engineering 454**<br>Advanced Electronic Circuits | (3-3) | 4 |
| **Electrical Engineering 428**<br>Communication Circuits | (2-3) | 3 | **Electrical Engineering 456**<br>Communication Theory | (3-0) | 3 |
| **Electrical Engineering 441**<br>Symmetrical Components of Polyphase Circuits | (3-0) | 3 | **Electrical Engineering 457**<br>Principles of Electronic Computers | (3-2) | 4 |
| **Electrical Engineering 451**<br>Applied Electromagnetic Theory | (3-0) | 3 | **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Electrical Engineering 452**<br>Ultra High Frequency Techniques | (2-3) | 3 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | | **Physics 405**<br>Physical Mechanics | (3-0) | 3 |

## For the class graduating in 1960-61

### SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 402**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 415**<br>Transmission Networks | (2-2) | 3 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 419**<br>Electronic Circuits | (3-3) | 4 | **Electrical Engineering 432**<br>Economic Phases of Engineering | (3-0) | 3 |
| **Electrical Engineering 481**<br>Seminar | (0-2) | 1 | **Electrical Engineering 482**<br>Seminar | (0-2) | 1 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 20 | | | 20 |

## Technical Electives for ELECTRICAL ENGINEERING

| | | |
|---|---|---|
| **Electrical Engineering 406**<br>Electric Power Distribution and Transmission | (2-2) | 3 |
| **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 428**<br>Communication Circuits | (2-3) | 3 |
| **Electrical Engineering 441**<br>Symmetrical Components of Polyphase Circuits | (3-0) | 3 |
| **Electrical Engineering 451**<br>Applied Electromagnetic Theory | (3-0) | 3 |
| **Electrical Engineering 452**<br>Ultra High Frequency Techniques | (2-3) | 3 |
| **Electrical Engineering 454**<br>Advanced Electronic Circuits | (3-3) | 4 |
| **Electrical Engineering 456**<br>Communication Theory | (3-0) | 3 |
| **Electrical Engineering 457**<br>Principles of Electronic Computers | (3-2) | 4 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |

## Curriculum in GEOLOGY

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Drawing 106**<br>Descriptive Geometry | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 19 | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 17 |
| | | 19 | | | |

## SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 | **English 319**<br>Report Writing | (1-0) | 1 |
| **English 371**<br>Great Books | (3-0) | 3 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 423**<br>Micropaleontology | (1-6) | 3 |
| | | 16 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | | | | 17 |

## SUMMER CAMP
Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | | |
|---|---|---|---|
| **Geology (three of the following)** | | | 9 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 437**<br>Cenozoic Micropaleontology | (1-6) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Elective** | | | 3 |
| | | | 17 |

| | | | |
|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Geology-Geophysics (any two)** | | | 6 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 | |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Elective** | | | 3 |
| | | | 16 |

## For the class graduating in 1960-61

## SENIOR YEAR

| | | | |
|---|---|---|---|
| **English 319**<br>Report Writing | (1-0) | | 1 |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geology (three of the following)** | | | 9 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 437**<br>Cenozoic Micropaleontology | (1-6) | 3 | |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Elective** | | | 3 |
| | | | 18 |

| | | | |
|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Geology-Geophysics (any two)** | | | 6 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 | |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Elective** | | | 6 |
| | | | 19 |

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*May be used as an elective.

## Curriculum in GEOLOGICAL ENGINEERING

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 20 |

### SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 220**<br>Engineering Mechanics | (4-0) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 | **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 | | | 17 |

### SUMMER CAMP

Geology 300, Field Geology, credit 6

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology (one of the following)** | | 3 | **Geology-Geophysics**<br>**(two of the following**)** | | 6 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | **Geology 423**<br>Micropaleontology | (1-6) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 425**<br>Subsurface Geology | (2-3) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 | **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 | **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| | | 17 | **Geology 433**<br>Field Geology | (0-6) | 2 |
| | | | **Geology 482**<br>Seminar | (1-0) | 1 |
| | | | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

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*May be used as an elective.

**Three credit hours of Geology 399 may be substituted for Geology 304, 409, 423, or 425.

### For the class graduating in 1960-61

### SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 |
| **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## Curriculum in
## GEOPHYSICS

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

(Same as for curriculum in geological engineering, page 179)

### SUMMER CAMP

(Optional*)

Geology 299, Field Geology, Credit 2

### JUNIOR YEAR

| | | |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| | | **16** |

| | | |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| | | **16** |

### SUMMER CAMP

Geology 300, Field Geology, credit 6

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*May be used as an elective

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Elective** | | 5 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **English 371**<br>Great Books | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

### For the class graduating in 1960-61

## SENIOR YEAR

| | | |
|---|---|---|
| **Chemistry 344**<br>Physical Chemistry<br>**Or** | (3-0) | |
| **Physics 311**<br>Atomic and Nuclear Physics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Physics 302**<br>Mechanical Properties of Matter | (2-3) | 3 |
| **Elective** | | 3 |
| | | 17 |

## Curriculum in INDUSTRIAL EDUCATION

### Industrial Arts Teacher Education Option

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 106**<br>Descriptive Geometry | (0-6) | 2 |
| **Engineering Drawing 128**<br>Methods of Industrial Reproduction | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Industrial Education 205**<br>Ornamental Iron | (1-5) | 3 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Engineering Drawing 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **Engineering Drawing 221**<br>Building Construction Drawing | (1-3) | 2 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 106**<br>Cabinet Making | (1-6) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Industrial Education 323**<br>Methods of Teaching Mechanical Drawing | (1-3) | 2 |
| **Industrial Education 327**<br>Industrial Arts Handcraft | (1-5) | 3 |
| **Industrial Education 334**<br>Upholstery | (1-3) | 2 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 4 |
| | | 19 |

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 310**<br>Course Making | (2-0) | 2 |
| **Industrial Education 332**<br>Plastics and Ceramics | (1-3) | 2 |
| **Industrial Education 336**<br>Design in the Arts and Crafts | (1-3) | 2 |
| **Mechanical Engineering 329**<br>Advanced Cabinet Making | (1-6) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 301**<br>Methods of Teaching and Class Management | (3-0) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Education 404**<br>Visual Aids for Industrial Subjects | (1-2) | 2 |
| **Industrial Education 406**<br>Industrial Guidance | (2-0) | 2 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| ***Government 305**<br>Government of the United States and Texas | (3-0) | 3 |
| **Industrial Education 419**<br>Laboratory of Industries Methods | (1-3) | 2 |
| **Industrial Education 442**<br>Supervised Teaching in Industrial Arts | (2-12) | 6 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Elective** | | 5 |
| | | 17 |

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*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

## Curriculum in
## INDUSTRIAL EDUCATION

### Vocational Industrial Teacher Education Option

(Prerequisite: At least one full year of employed experience at some skilled trade or industrial technical occupation.)

A student who desires to graduate under this plan must submit a written request accompanied by a statement of his employed practical experience. Upon the approval of the request by the Head of the Department and the Dean of Engineering, the student will be permitted to plan a program within the limit of the courses listed below as approved by the Head of the Department.

Approved industrial experience will be evaluated in terms of college credits and, if acceptable to the Head of the Department and the Dean of the School of Engineering, may be used in the place of shop work on the basis of four credit hours for each year of experience up to a maximum of twenty credits. Approved teaching experience may be credited as practice teaching on the basis of two credit hours per year up to a maximum of six credits.

### REQUIRED COURSES

| GENERAL EDUCATION | | | Minimum Credits |
|---|---|---|---|
| **Economics** | | | 6 |
| Economics 203<br>Principles of Economics | (3-0) | 3 | |
| Economics (elective) | | 3 | |
| **English** | | | 10 |
| English 103<br>Composition and Rhetoric | (3-0) | 3 | |
| English 104<br>Composition and Rhetoric | (3-0) | 3 | |
| English 203<br>Introduction to Literature | (2-0) | 2 | |
| English 210<br>Introduction to Logical Discourse | (2-0) | 2 | |
| **Government** | | | 3 |
| *Government 305<br>Government of the United States and Texas | (3-0) | 3 | |
| **History** | | | 6 |
| History 105<br>History of the United States | (3-0) | 3 | |
| History 106<br>History of the United States | (3-0) | 3 | |
| **Mathematics** | | | 6 |
| Mathematics 102<br>Algebra | (3-0) | 3 | |
| Mathematics 103<br>Plane Trigonometry | (3-0) | 3 | |
| **Public Speaking** | | | 1 |
| English 401<br>Public Speaking | (0-2) | 1 | |
| **Rural Sociology** | | | 3 |
| Sociology (elective)<br>(Rural Sociology 315 not acceptable) | | 3 | |

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*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

## TECHNICAL

| | | | |
|---|---|---|---|
| **Engineering Drawing** | | | 4 |
| Engineering Drawing 105<br>Engineering Drawing | (0-6) | 2 | |
| Engineering Drawing 106<br>Descriptive Geometry | (0-6) | 2 | |
| **Engineering Problems** | | | 1 |
| Mechanical Engineering 101<br>Engineering Problems | (0-3) | 1 | |
| **Shop Work**<br>Includes credit for industrial work experience | | | 24 |

## SCIENCE

| | | | |
|---|---|---|---|
| **Chemistry** | | | 4 |
| Chemistry 106<br>General Chemistry | (3-3) | 4 | |
| **Industrial Supervision or Management** | | | 3 |
| Industrial Education 429<br>Foremanship and Supervision | (3-0) | 3 | |
| Or | | | |
| Industrial Engineering 401<br>Survey of Industrial Engineering | (3-0) | 3 | |
| **Modern Industries** | | | 3 |
| Industrial Education 308<br>A Study of Modern Industries | (3-0) | 3 | |
| **Physics** | | | 8 |
| Physics 201<br>College Physics | (3-3) | 4 | |
| Physics 202<br>College Physics | (3-3) | 4 | |

## MILITARY TRAINING

| | | | |
|---|---|---|---|
| **Military or Air Science** | | | 4 |

## PROFESSIONAL EDUCATION

The courses listed below are the basic ones required by the Vocational Division of the Texas Education Agency for a vocational certificate.

| | | | |
|---|---|---|---|
| **General Requirements** | | | 9 |
| Industrial Education 204<br>Development and Practice in Industrial Education | (3-0) | 3 | |
| Industrial Education 301<br>Methods of Teaching and Class Management | (2-0) | 2 | |
| Industrial Education 310<br>Course Making | (2-0) | 2 | |
| Industrial Education 424<br>Organization of Instructional Material | (1-2) | 2 | |

Additional courses and related fields are listed below depending upon the certificate desired.

| | | | |
|---|---|---|---|
| **For Vocational Industrial Shop Teachers**<br>Visual Aids for Industrial Subjects<br>Methods of Introducing Industrial Organization and Management into Industrial Schools | | 6 | |
| Or | | | 6 |
| **For Part-Time Cooperative Training Coordinators**<br>Follow-up, Visitation, and Coordination in Part-Time Schools<br>Related Subjects in Part-Time Cooperative Programs | | 6 | |
| **Supervised Teaching** | | | 6 |
| **Other general education courses suited to the needs of the student** | | | 8 |

## ELECTIVE

| | | | |
|---|---|---|---|
| **To be approved by the Head of the Department** | | | 30 |
| | **TOTAL CREDITS** | | **145** |

## Curriculum in
## INDUSTRIAL EDUCATION

### Industrial Technology and Industrial Distribution Option

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Engineering Drawing 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Drawing 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Engineering Drawing 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | (2-3) | 3 |
| **Industrial Education 308**<br>A Study of Modern Industries | (3-0) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Elective** | | 7 |
| | | 19 |

| | | |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Industrial Education 429**<br>Foremanship and Supervision | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 | **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Elective** | | 7 | **Elective** | | 8 |
| | | 18 | | | 18 |

NOTE: INDUSTRIAL TECHNOLOGY: Students pursuing this option must include the following courses as part of the elective requirement:

| Course | | Credit |
|---|---|---|
| **Industrial Education 423**<br>Analysis Procedure | (1-2) | 2 |
| **Industrial Education 438**<br>Industrial Safety | (2-3) | 3 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |

INDUSTRIAL DISTRIBUTION: Students interested in Industrial Distribution must include the following courses as part of the elective requirement:

| Course | | Credit |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 318**<br>Wholesale Merchandising | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |

## ELECTIVES FOR INDUSTRIAL EDUCATION

Electives for all options in industrial education are to be selected from the general engineering electives shown on page 198; from the sophomore, junior, or senior courses offered by the Department of Engineering Drawing; or from the following:

| Course | | Credit |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Civil Engineering 202**<br>Advanced Surveying | (2-3) | 3 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Civil Engineering 300**<br>Summer Surveying Practice | | 5 |
| **Education 426**<br>Tests and Measurements | (3-0) | 3 |
| **Education 427**<br>Principles of Guidance | (3-0) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Industrial Education 427**<br>Driver Education | (1-6) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Psychology 305**<br>Personality Adjustments | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Rural Sociology 304**<br>Criminology and<br>Juvenile Delinquency | (3-0) | 3 |
| **Rural Sociology 315**<br>The Family | (3-0) | 3 |
| **Rural Sociology 408**<br>Organization for Boy Scout Work | (2-0) | 2 |

Additional electives for the teacher education options may be selected from required courses for the industrial technology option, from the junior or senior courses offered by the Department of Education and Psychology, or from the following courses:

| | | |
|---|---|---|
| **Physical Education 253**<br>Coaching of Baseball | (1-3) | 2 |
| **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |

Additional electives for the industrial technology and industrial distribution option may be selected from the required courses for the industrial arts teacher education option or from the following courses:

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Business Administration 324**<br>Casualty Insurance and Suretyship | (3-0) | 3 |
| **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 |
| **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |

Those desiring to elect courses not listed above must secure the written approval of the Head of the Department of Industrial Education and of the Dean of the School of Engineering.

## Curriculum in
## INDUSTRIAL ENGINEERING

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Industrial Engineering 202**<br>Introduction to Industrial Engineering | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
| | | 17 | | | 16 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 | **Industrial Engineering 452**<br>Tool Design Laboratory | (0-3) | 1 |
| **Industrial Engineering 451**<br>Tool Engineering | (2-0) | 2 | **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 | **Industrial Engineering 481**<br>Seminar | (0-2) | 1 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 | **Technical Elective** | | 5 |
| **Elective (Humanities)** | | 3 | | | 17 |
| | | 17 | | | |

### For the class graduating in 1960-61

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 | **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 | **Industrial Engineering 452**<br>Tool Design Laboratory | (0-3) | 1 |
| **Industrial Engineering 451**<br>Tool Engineering | (2-0) | 2 | **Industrial Engineering 481**<br>Seminar | (0-2) | 1 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 | **Technical Elective** | | 5 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 | **Elective** | | 3 |
| **Elective** | | 3 | | | 19 |
| | | 18 | | | |

## Technical Electives for
## INDUSTRIAL ENGINEERING

The student should observe that these electives may be used for obtaining a better background in statistics, accounting, or economics. Some technical subjects are available for those so inclined.

| | | | |
|---|---|---|---|
| **Business Administration 303** | Statistical Method | (3-3) | 4 |
| **Business Administration 304** | Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 305** | Business Law | (3-0) | 3 |
| **Business Administration 316** | Office Management | (2-0) | 2 |
| **Business Administration 337** | Data Processing | (2-2) | 3 |
| **Business Administration 418** | Corporation Finance | (3-0) | 3 |
| **Business Administration 420** | Principles of Investment | (3-0) | 3 |
| **Business Administration 435** | Salesmanship | (3-0) | 3 |
| **Business Administration 446** | Marketing Industrial Products | (2-0) | 2 |
| **Business Administration 463** | Employee Supervision | (2-0) | 2 |
| **Economics 311** | Money and Banking | (3-0) | 3 |
| **Economics 318** | Economics of Labor | (3-0) | 3 |
| **Economics 437** | Government and Labor Relations | (2-0) | 2 |
| **Electrical Engineering 325** | Electronics | (3-0) | 3 |
| **Electrical Engineering 331** | Theory and Application of Electron Tubes | (3-3) | 4 |
| **Electrical Engineering 420** | Servomechanisms and Control Devices | (3-0) | 3 |
| **Engineering Drawing 209** | Nomography | (2-0) | 2 |
| **Genetics 406** | Biometry—Experimental Technique | (2-3) | 3 |
| **Industrial Education 328** | Industrial Accident Prevention | (3-0) | 3 |
| **Industrial Engineering 410** | Current Practices in Industrial Engineering | | 3 |
| **Industrial Engineering 411** | Wage and Salary Control | (3-0) | 3 |
| ***Industrial Engineering 458** | Programming of Digital Computers | (3-2) | 4 |
| **Industrial Engineering 485** | Special Problems in Industrial Engineering | | 1 to 3 |
| **Journalism 321** | Industrial Journalism | (2-2) | 3 |
| **Journalism 406** | Publicity and Public Relations | (3-0) | 3 |
| **Mathematics 308** | Differential Equations | (3-0) | 3 |
| **Mathematics 411** | Mathematical Probability | (3-0) | 3 |
| **Mathematics 414** | Mathematical Statistics | (3-0) | 3 |
| **Mathematics 417** | Numerical Analysis | (3-3) | 4 |
| ****Mechanical Engineering 338** | Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 436** | Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 445** | Machine Design | (2-3) | 3 |
| **Mechanical Engineering 446** | Machine Design | (2-3) | 3 |
| **Mechanical Engineering 457** | Engineering Analysis | (3-0) | 3 |
| **Nuclear Engineering 401** | Nuclear Engineering | (3-0) | 3 |
| **Psychology 303** | Psychology for Technical Students | (3-0) | 3 |
| **Psychology 401** | Industrial Psychology | (3-0) | 3 |

## Curriculum in
## MECHANICAL ENGINEERING

(Steam Power, Internal Combustion Engines, Automotive, Refrigeration, Air Conditioning, Physical Metallurgy, Heat Transfer, Vibration, and Machine Design)

### FRESHMAN YEAR

(See page 170)

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*Until 1961-62 academic year, required thereafter.

**May be used for Mechanical Engineering 337 and 2 hours of technical elective.

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| | | 17 |

### For the class graduating in 1960-61

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (4-0) | 4 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 482**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective** | | 3 |
| | | 19 |

## Technical Electives for MECHANICAL ENGINEERING

| Course | Hours | Credit |
|---|---|---|
| **Mechanical Engineering 409**<br>Structure and Properties of Alloys | (2-3) | 3 |
| **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| **Mechanical Engineering 414**<br>Steam and Gas Turbines | (3-0) | 3 |
| **Mechanical Engineering 432**<br>Automotive Engineering | (3-0) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| ***Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| ***Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Mechanical Engineering 485**<br>Advanced Problems in Mechanical Engineering | | 2 to 5 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |

## Four-Year Curriculum in PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricty | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

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*Until 1961-62 academic year, required thereafter.

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | **Elective (Humanities)** | | 6 |
| **Elective (Humanities)** | | 3 | | | 17 |
| | | 17 | | | |

## For the class graduating in 1960-61

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| ***Elective** | | 9 | ***Elective** | | 9 |
| | | 20 | | | 20 |

## Five-Year Curriculum in PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

## FRESHMAN YEAR

(See page 170)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 20 | | | 20 |

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*Six of these elective hours are to be chosen from the humanities.

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-3) | 1 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **English 320**<br>Selected Reading | (1-0) | 1 | **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 | **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 | **Elective (Humanities)** | (4-0) | 4 |
| | | 17 | | | 16 |

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## For classes graduating in 1960-61 and 1961-62

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **English 320**<br>Selected Reading | (1-0) | 1 | **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 | **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 | **Elective (Humanities)** | | 4 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 20 | | | 19 |

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*To be chosen from Petroleum Engineering 416 or 419.

## FIFTH YEAR

| First Semester | | Credit |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## Five-Year Curriculum in
## PETROLEUM ENGINEERING—GEOLOGICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

### SUMMER CAMP

(Optional)

Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

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*To be chosen from Petroleum Engineering 416 or 419.

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology or Geophysics Elective*** | | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| | | 19 |

| | | |
|---|---|---|
| **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geology or Geophysics Elective**** | | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| | | 16 |

### For classes graduating in 1960-61 and 1961-62

## SENIOR YEAR

| | | |
|---|---|---|
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective** | | 3 |
| | | 19 |

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*To be selected from: Geology 304, 409, 423, 443; Geophysics 436, 446.

**To be selected from: Geology 304, 409, 423, 425, 443; Geophysics 436, 446.

### SUMMER CAMP

Geology 300, Field Geology, credit 6

### FIFTH YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | **Geology 425**<br>Subsurface Geology | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 413**<br>Petroleum Measurement<br>and Transportation | (2-2) | 3 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | **Elective** | | 6 |
| **Elective** | | 3 | | | 19 |
| | | 18 | | | |

## Five-Year Curriculum in PETROLEUM ENGINEERING— MECHANICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

### FRESHMAN YEAR

(See page 170)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 20 | | | 20 |

### SUMMER SESSION

| First Term | | Credit | Second Term | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (9-0) | 3 | **Geography 401**<br>International Political Geography | (9-0) | 3 |
| **History 106**<br>History of the United States | (9-0) | 3 | **Government 306**<br>American National Government | (9-0) | 3 |
| | | 6 | | | 6 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 482**<br>Seminar | (0-2) | 1 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 16 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 18 |

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*From Mechanical Engineering Approved List.

### For classes graduating in 1960-61 and 1961-62

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| **Elective** | | 3 |
| | | 21 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective** | | 3 |
| | | 20 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (4-0) | 4 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| | | 20 |

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| | | 19 |

## General Electives in ENGINEERING

Students with the proper prerequisites may choose their general electives from the list below. Other courses are available to the student upon recommendation of department heads and the approval of the Dean of Engineering.

### I. Humanistic—Social

1. Architecture 339, 340, 439, 440; English 212, 231, 232, 315, 316, 321, 322, 327, 328, 334, 336, 340, 350, 371, 375; Geography 204, 312, 401; Liberal Arts 201, 301, 304; Psychology 207, 301, 303, 305, 401, 403; Rural Sociology 205, 206, 311, 314, 315, 320, 412, 418.
2. Economics: Any course offered by the Department.
3. History and Government: Any junior or senior course offered by the Department.
4. Modern Languages: Any course offered by the Department.
5. Religious Education: Any course, but not more than 4 semester hours may be counted.

## II. Others

1. Civil Engineering 406, 408, 448, 473; Electrical Engineering 331, 457; Engineering Drawing 221; English 301, 309; Geology 201; Health Education 216; Industrial Education 328, 429; Industrial Engineering 401, 411, 412, 414, 458; Journalism 304, 311, 315, 321, 406; Landscape Architecture 408; Oceanography 401; Physical Education 210, 221.
2. Biology: Any course, but not more than 7 hours of freshman courses.
3. Business Administration: Any sophomore, junior, or senior course offered by the Division.
4. Chemistry: Any sophomore, junior, or senior course offered by the Department.
5. Mathematics: Any junior or senior course offered by the Department.
6. Nuclear Engineering: Any course offered by the Department.
7. Physics: Any junior or senior course offered by the Department.

# THE SCHOOL OF MILITARY SCIENCES

The participation of our government in foreign affairs makes it apparent that every young American must recognize his obligation for service to his country and should realize the necessity for coordination of his military and civilian careers. The Army and Air Force at the Agricultural and Mechanical College of Texas offer ROTC courses which supplement the student's civilian curriculum and offer him the opportunity of planning his civilian and military careers on a mutually supporting basis.

In the words of President Eisenhower, "ROTC is a ready-made course, designed and perfected to develop the qualities of leadership required in both military and civil enterprise."

## AIR SCIENCE

The Air Force ROTC program is designed to develop qualities of leadership, character, and citizenship, and to prepare selected college students to be commissioned officers in the Regular and Reserve components of the United States Air Force. The first Air Force (then Air Service) ROTC units were established in 1920 at the University of California, the University of Illinois, the Massachusetts Institute of Technology, and the Agricultural and Mechanical College of Texas. Today, the program includes over 100,000 students at approximately 180 colleges and universities.

The Air Force ROTC program is divided into two parts. The first two years are known as the basic course and the second two years as the advanced course. Successful completion of the advanced course is a prerequisite for commissioning. The basic course acquaints students with the air power concept and prepares them for the advanced course. However, since not all cadets will qualify for entry into the advanced course, the emphasis in the basic course is on air age citizenship and is intended to help all young men face the challenge of the Aerospace Age.

Cadets in the basic course spend two hours a week in the classroom and one hour in a leadership laboratory. The first year is a survey of the constituent elements of air power, basic aeronautical science, and the organization and operation of the miltary arm of the Federal Government. The second year consists of a survey of the development of aerial warfare with emphasis on principles of war, concepts of employment of forces, and changing weapons systems, bases, materiel, personnel, and operations. The problems and possibilities of operating in space are also discussed. Students enrolled in the basic course are deferred from draft by Selective Service. The Air Force reimburses the College for furnishing students with uniforms and textbooks.

Leadership training is continuous during the student's life as an Air Force ROTC cadet. Classroom instruction and the leadership laboratory are both designed to develop to the maximum each cadet's leadership potential and his knowledge of basic military fundamentals. Instruction in military courtesy and discipline will be of value in any walk of life. The common courtesies, respect for authority, and intelligent leadership demanded by the Air Force are the same qualities needed for success in civilian life. In this program, the cadet has an opportunity to apply principles of leadership, management, and staff work in actual working situations.

Cadets apply for enrollment in the advanced course during their second year of basic air science. Those who apply are given a physical examination and take the Air Force Officer Qualification Test. Enrollment in the advanced course is limited to students of high moral character who are physically qualified, who possess the necessary interest, intelligence, and aptitude, who have demonstrated leadership potential, and who are well qualified academically. It is emphasized, for selection for enrollment in the advanced course, that the cadet must have proven himself diligent and successful in his regular studies and not just in his Air Force ROTC courses. Academic excellence is strongly encouraged. The purpose of this program is to supplement the student's regular academic work with training intended to better prepare him to accept and discharge the responsibilities of leadership that are inherent in commissioned officer positions. Graduation and a degree are prerequisites to a commission, but the bare minimum is not acceptable. An advanced course cadet is a member of a select group.

The curriculum of the advanced course is the same for all cadets. The first year of the advanced course is a study of the principles of leadership and management as they apply to Air Force problems and tasks. Included are Air Force leadership doctrine, major socio-psychological principles of leadership, a consideration of the leader-follower relationship in an Air Force environment, and communication theory relevant to leadership. During the summer between the first and second years of the advanced course, the cadet is required to attend a four-week summer camp on an Air Force base. Here during a period of intense training under close supervision, he sees the Air Force in operation and becomes familiar with its equipment, procedures, and systems. The second year of the advanced course is a study of global relationships of special concern to the Air Force officer with attention to such aspects as weather, navigation, world political geography, and international relations.

With the approval of the Air Force and the College, certain college courses have been substituted recently for Air Science courses with similar objectives. These courses are English 210, Introduction to Logical Discourse; English 401 (or 403), Public Speaking; History 318, International Developments Since 1918; and Geography 401, International Political Geography. As a result, the advanced course Air Force ROTC student has extra time available to further his study in his academic major.

During his senior year, a cadet who has applied for Air Force pilot training is given 35 hours of flight training in light aircraft and 35 hours of ground school. Flight training is provided at the College by FAA-approved flying school operators and upon successful completion the student is eligible for a private pilot's license.

If a student applies for the advanced course and is selected for enrollment, he must agree to complete the advanced course, complete the Summer Training Unit during the summer between his junior and senior years, and upon graduation, accept a commission as an officer in the Air Force Reserve if one is tendered. The foregoing becomes an integral part of his degree requirements from the College. He must also agree to serve on active duty for not less than three years after being commissioned, or, if applying for flight training either as a pilot or as a navigator, must agree to serve on active duty for not less than four years after completion of basic flight training. Advanced course cadets are deferred from draft by Selective Service. They receive approximately $500.00 from the Air Force during their two years in the program. This is in addition to their pay and travel allowances received in connection with their attendance at the Summer Training Unit.

Upon successfully completing the advanced course and graduating from the College, students are commissioned as second lieutenants in the United States Air Force Reserve. Distinguished graduates are eligible to apply for commissions in the Regular Air Force.

The Air Force ROTC program is administered by the Department of Air Science, which is an integral part of the College. All instructors are active duty officers assigned to the College by the United States Air Force. Details on courses offered are set forth under the departmental listing in this catalogue. Information desired may be obtained by writing directly to the Head of the Department of Air Science.

## MILITARY SCIENCE

While the four-year ROTC course normally leads to a reserve commission, the Army relies upon this source for half of the new Regular Army officers appointed each year. The Army program is a general military science curriculum, and under the Distinguished Military Graduate program, interested cadets can apply for and be granted regular commissions upon graduation. Those students selected must be outstanding in military aptitude and academic proficiency. They will be tendered the same type of commission given graduates of the United States Military Academy, West Point, New York. Many A. and M. graduates who received their commissions under this program are now actively pursuing Army careers.

Branch assignments for regular and reserve commissions will be made by the Department of the Army. These branch assignments will be based on the curriculum of the student's major field of study, student preference, leadership and technical qualifications. Students will select five branches in order of preference and then will be required to appear before a board who will make a recommendation of assignment. If a student is physically qualified for a commission in the combat branches, three of the five branches selected will be combat arms.

## THE ARMY COMBAT ARMS

The mission of the entire Army is to support the fighting teams on the battle lines — the men who get there first. These teams are made up of Infantry, Armor, Artillery, Engineers, and Signal Corps. These are the raison d'etre of the Army — highly trained in specialities which can be learned nowhere but in the Army and its training units such as the ROTC.

ARMOR. Armor is the combat arm with characteristics and capabilities designed for offensive action. It is an arm of mobility, armor protected fire power, and shock action. It uses its mobility in exploitation of combat successes, in puruit of a fleeing enemy, in seizing objectives deep in enemy rear areas, in reconnoitering over broad frontages, and providing depth and a wide radius of action in defense. Armor concentrates its fire power at the decisive area of action to lead, accompany or support Infantry in the penetration of enemy defenses, and to destroy enemy counter attacks. It utilizes its shock action to close with and destroy the enemy. Armor is massed in close coordination with other arms and is supported by the tactical Air Force.

No special academic course is required for commission in Armor.

ARTILLERY. Artillery is the combat branch which is primarily concerned with the employment and firing of cannon in warfare. Its armament includes many types of guns, howitzers, rockets and guided missiles, all designed to enhance the destructive potential of the army against hostile targets on the ground, in the air, and on the water.

To combat these diversified targets, artillery is comprised of two general types—field artillery and antiaircraft artillery—each type being armed with weapons and equipment commensurate with its combat responsibilities.

With the advent of rockets and guided missiles, an even wider field is being opened for the Artilleryman. Varieties of rockets and guided missiles have been developed for the use of the Artillery in coping with the higher speeds and altitudes of modern aircraft and greater ranges to ground targets. The field is open for employment of electronic equipment which will cause rockets to locate and automatically direct themselves to targets at extremely high altitudes, speeds and ranges.

No special academic course is required for commission in the Artillery, although a demonstrated aptitude for mathematics is desirable.

INFANTRY. Post World War II hostilities have illustrated again that the Infantry officer is the key to success in battle. He is the bulwark of

Americanism whose steadfastness is the true measure of our national security.

As the lives of our fighting men are more highly valued than the equipment of war, competent leadership is imperative. To meet this need, the U. S. Infantry officer has developed throughout our history to his present status of personnel management specialist. Toward that end he undergoes a career-long balanced program of training that includes fine service schools and the best civilian colleges, as well as service in both command and staff capacities.

No special academic course is necessary for commission in the Infantry.

THE CORPS OF ENGINEERS. The Corps of Engineers is both a combat arm and a technical service of the Department of the Army. In addition it has a civil mission. This multiple function presents a challenging and varied career for Engineer officers. Engineer military operation is world-wide, embracing most fields of engineering and construction practices in highly diversified geographical and political areas.

The civil works function of the Corps of Engineers is supervised directly by the Congress of the United States and includes river and harbor developments, flood control, canals, dams, and relief work in disaster areas.

To be commissioned in the Corps of Engineers a student must pursue a course which leads to a degree in an engineering, technical or other scientific field.

THE SIGNAL CORPS. The Signal Corps is both a combat arm and a technical service of the Department of the Army. As a combat arm, its mission is to provide the communications network for all military operations from Department of the Army Headquarters to the front lines. This service is performed in peace and in war by the most practical and efficent means consistent with modern developments. As a technical service, its mission is to develop, procure, and maintain equipment used for such fields as electronics, avionics, meteorology, photography, and television. This service includes the engineering, installation, operation, and maintenance of fixed Army communications and the training of signal specialists. Signal communications are the nerve system of the Army which enables coordination of effort by all branches.

To be commissioned in the Signal Corps a student must pursue a course which leads to a degree in the fields of engineering, electronics, physics, meteorology, or mathematics.

## THE TECHNICAL SERVICES

ARMY SECURITY AGENCY. The mission of the Army Security Agency is related to the application of procedures designed to insure smooth functioning of the Army's world-wide electrical communication facilities, and to deny to unauthorized persons access to information which might be detrimental to the national defense. In the United States Army Reserve there is a separate branch designated the Army Security Reserve even though in the active Army the Army Security Agency is not a branch of the service.

No special academic course is required for a commission in Army Security Agency, though it is desirable that a majority of the personnel have a technical background in such fields as electronics, mathematics, and allied phases of engineering.

THE CHEMICAL CORPS. The Chemical Corps is charged with the investigation, research, design, and development of chemical, biological, and radiological warfare items. It is concerned with smoke and incendiary materials, toxic gases, all war gas defense appliances, and biological warfare and radiological defense activities. It furnishes advice to all elements of the Department of Defense on chemical and biological warfare and radiological defense. It is responsible for the supervision of training of the army in chemical and biological warfare and radiological defense.

To be commissioned in the Chemical Corps a student must be pursuing a course which leads to a degree in a scientific or engineering field, with preference for the chemical, biological, and mechanical arts and sciences.

THE ORDNANCE CORPS. The Ordnance Corps provides the Armed Forces of our country with materiel for firepower and mobility—rifles, machine guns, artillery, ammunition, tanks, and trucks. Ordnance materiel ranges from time pieces to radar controlled automatic antiaircraft guns; from jeeps to ponderous tank transporters; from pistol cartridges to guided missiles.

Ordnance officers perform work closely related with business and industry. They must be businessmen but the technical nature of Ordnance Corps activities calls for an engineering or scientific background.

To be commissioned in the Ordnance Corps a student must pursue a course which leads to a degree in engineering, technical or other scientific fields.

THE QUARTERMASTER CORPS. One of the world's largest business organizations, the Quartermaster Corps supplies over 70,000 items to a million men all over the globe; and in time of war this may be expanded to 85,000 items to ten million men.

Quartermaster officers of outstanding executive caliber and of potentially sound business sense design, produce, test and supply clothing for every climate, food for every mealtime situation, and petroleum products for all purposes. These officers are at once merchants, importers, exporters, warehouse managers, purchasing agents, and expediters.

No special academic course is required for a commission in the Quartermaster Corps.

THE TRANSPORTATION CORPS. The Transportation Corps performs transportation functions for the Army and provides such transportation service to the Air Force or Navy as may be directed. Transportation officers are the Army's traffic managers as well as highway and railroad executives. Constant improvement in the movement of men and supplies throughout the world challenges the initiative, leadership, and ingenuity of transportation officers in command or staff capacities, many of which are closely allied with civilian occupations.

No special academic course is required for a commission in the Transportation Corps.

## THE ADMINISTRATIVE SERVICES

ADJUTANT GENERAL'S CORPS. The Adjutant General's Corps provides military personnel management, Special Services activities, and administrative service for the Army establishment and for other components of the Department of Defense. The qualified Adjutant General's Corps officer is the Army's expert in administrative and personnel matters and is a key member on the Commander's Staff.

No special academic course is required for a commission in the Adjutant General's Corps although business, commerce, and psychology are recommended educational fields.

FINANCE CORPS. The Finance Corps provides finance services for the Army and other components of the Department of Defense. The activities include paying military personnel, allotments for dependents of service personnel, and paying the salaries of civilian personnel of the Army.

No special academic course is required for a commission in the Finance Corps although business and commerce are recommended educational fields.

MILITARY POLICE CORPS. The primary mission of the Military Police Corps is to assist the commander in maintenance of discipline by enforcement of law and order within the military establishment. Thus military policemen will ordinarily be found directing military traffic; patrolling streets in towns where soldiers frequently congregate, investigating crimes committed against individual soldiers, civilians, or the Army; apprehending deserters and personnel absent without leave; maintaining order aboard trains and ships; and providing security for certain types of military operations and installations.

A young officer with initiative and willingness to accept responsibility and who can meet the high standards required will find in the Military Police Corps a future and a career without parallel.

No special academic course is required for a commission in the Military Police Corps.

# THE SCHOOL OF VETERINARY MEDICINE

The principal objective of the School of Veterinary Medicine is to provide complete training in all the phases of veterinary medicine. The degree of Doctor of Veterinary Medicine is conferred upon satisfactory completion of the curriculum in veterinary medicine. By following Curricular Option I, the student may qualify after four years of study for the degree of Bachelor of Science in Animal Science. (See Curricular Options below.)

The School of Veterinary Medicine is composed of the Departments of Veterinary Anatomy, Veterinary Medicine and Surgery, Veterinary Microbiology, Veterinary Parasitology, Veterinary Pathology, Veterinary Physiology and Pharmacology, and Veterinary Public Health. The Department of Veterinary Medicine and Surgery operates the Veterinary Hospital and Ambulatory Clinics. A large proportion of the faculty from all departments is actively engaged in research. In addition to undergraduate instruction, graduate offerings are available leading to the degrees of Master of Science and Doctor of Philosophy.

Training is such that graduates of the School of Veterinary Medicine are well qualified to deal with problems of disease and disease prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, and wild life. Graduates also are well qualified to administer and advise in the public health problems arising from intertransmission of diseases between man and the lower animals. Instruction and practical training are given in milk and meat hygiene and in the inspection of food processing plants. The School is accredited by the Council on Education of the American Veterinary Medical Association and by the United States Department of Agriculture.

## ENTRANCE REQUIREMENTS

Admission to the curriculum in veterinary medicine is granted only for the beginning of the fall semester. Formal application must be filed with the Director of Admissions and Registrar between March 1 and May 1 of the year for which admission is sought. Accompanying the application form must be: complete academic records, including the preparatory record and college record; a record of courses in progress; and a statement showing the applicant to be in good standing.

Minimum pre-veterinary requirements are 70 semester hours including:

| | |
|---|---|
| English composition and rhetoric | 6 hours |
| Biology (at least 4 hours must be zoology) | 8 hours |
| Inorganic chemistry | 8 hours |
| Organic chemistry | 8 hours |
| Physics | 6 hours |
| American history | 6 hours |
| American government | 3 hours |

Completion of the pre-veterinary requirements with satisfactory grades is a prerequisite for admission to the first year of the curriculum in veterinary medicine or to the veterinary courses of that year.

## CURRICULAR OPTIONS

Three curricular options are open to students planning to study veterinary medicine.

### Option I

Students may qualify for the degree of Bachelor of Science in Animal Science, to be conferred after four years of study. Under this option the recommended pre-veterinary curriculum and the regular veterinary curriculum are followed. Elective requirements must be met by completing the following courses:

Agronomy 301; Economics 203; English 403; and Genetics 406.

Substitutions for any of the courses required for this Animal Science degree may be made only with approval of the Dean of the School of Agriculture.

**Option II**

Students may qualify for a Reserve Officer's commission by scheduling advanced military or air science as electives in the first and second years of veterinary medicine. The number who are permitted to follow this option will necessarily be contingent upon the number of advanced ROTC contracts available.

**Option III**

Students who do not wish to qualify either for a Reserve Officer's commission or for the Bachelor of Science degree may register for electives of their own choosing, subject to approval by the Dean of the School of Veterinary Medicine.

Wherever possible, the student should choose his option early in the pre-veterinary curriculum.

## PRE-VETERINARY MEDICINE

The following pre-veterinary curriculum is designed to afford the student the best possible preparation for veterinary training. Courses marked with asterisks are requirements. Substitutions for other courses may be made only with the permission of the Dean of the School of Veterinary Medicine.

## Curriculum in PRE-VETERINARY MEDICINE

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 | ***Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| ***Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | ***Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| ***Chemistry 101**<br>General Chemistry | (3-3) | 4 | ***Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| ***English 103**<br>Composition and Rhetoric | (3-0) | 3 | ***English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| ***Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | ***Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | ***Physics 216**<br>Introductory Physics | (2-3) | 3 |
| ***Physics 215**<br>Introductory Physics | (2-3) | 3 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 19 |

NOTE: All students must complete Entomology 208 or its equivalent before the second year in Veterinary School.

Substantially the same pre-veterinary curriculum as that outlined above should be completed by students expecting to qualify for admission to the School of Veterinary Medicine in the minimum time (two college academic years.) However, a student with a Bachelor of Science degree may be admitted to the veterinary curriculum with certain pre-veterinary deficiencies. The Dean of the School of Veterinary Medicine shall be the authority on these matters.

## LIMITED ENROLLMENT

Enrollment in the first year of the curriculum in veterinary medicine is limited by facilities of the College to a definite number each year. Selection within this quota is based on scholastic record and professional aptitude, and admission to the curriculum in pre-veterinary medicine does not carry assurance that the student will be admitted to the first year in veterinary medicine.

## ADMISSION TO THE THIRD YEAR OF VETERINARY MEDICINE

Regardless of the option chosen, a student may not be permitted to register for the third year of veterinary medicine unless he has completed, with an average grade of C or better, all work prescribed in the first two years of the veterinary curriculum.

## READMISSION

A veterinary student who voluntarily withdraws from the College, or who is dropped from the rolls of the College for cause, forfeits his standing and must apply for readmission. A student who fails any of his veterinary courses may be required to withdraw from the School of Veterinary Medicine.

## ELECTIVES

Students in the School of Veterinary Medicine who do not enroll in advanced ROTC must complete English 403 (Speaking for Professional Men). The remaining 10 credit hours of elective courses must be chosen with the approval of the Dean of the School of Veterinary Medicine.

## Curriculum in VETERINARY MEDICINE

### FIRST YEAR

| First Semester | | Credit |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Anatomy 301**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 303**<br>Histology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 320**<br>Animal Nutrition and Feeding | (3-0) | 3 |
| **Veterinary Anatomy 302**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 304**<br>Embryology | (3-3) | 4 |
| **Veterinary Anatomy 306**<br>Neuroanatomy | (0-6) | 2 |
| **Veterinary Physiology and Pharmacology 326**<br>Physiology | (4-3) | 5 |
| **Elective** | | 3 |
| | | 20 |

## SECOND YEAR

| First Semester | | Credit |
|---|---|---|
| **Veterinary Microbiology 435**<br>Microbiology and Immunology | (3-4) | 4 |
| **Veterinary Parasitology 483**<br>Parasites of Domestic Animals | (2-2) | 3 |
| **Veterinary Pathology 443**<br>General Pathology | (4-3) | 5 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Veterinary Medicine and Surgery 416**<br>General Surgery | (1-0) | 1 |
| **Veterinary Microbiology 436**<br>Pathogenic Microbiology | (3-3) | 4 |
| **Veterinary Parasitology 484**<br>Parasites of Domestic Animals | (2-2) | 3 |
| **Veterinary Pathology 444**<br>Special Pathology | (5-3) | 6 |
| **Veterinary Physiology and Pharmacology 428**<br>Pharmacology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 20 |

## THIRD YEAR

| | | |
|---|---|---|
| **Veterinary Anatomy 501**<br>Surgical Anatomy | (0-6) | 2 |
| **Veterinary Medicine and Surgery 511**<br>Non-Infectious Diseases of Large Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 513**<br>Non-Infectious Diseases of Small Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 515**<br>General Surgery | (4-0) | 4 |
| **Veterinary Medicine and Surgery 519**<br>Clinics | (0-4) | 1 |
| **Veterinary Medicine and Surgery 526**<br>Obstetrics | (2-0) | 2 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (2-3) | 3 |
| **Veterinary Public Health 533**<br>Food Hygiene | (1-2) | 2 |
| | | 20 |

| | | |
|---|---|---|
| **Veterinary Medicine and Surgery 512**<br>Radiology | (2-0) | 2 |
| **Veterinary Medicine and Surgery 514**<br>Infectious Diseases of Small Animals | (2-0) | 2 |
| **Veterinary Medicine and Surgery 516**<br>Operative Surgery of Large Animals | (2-2) | 3 |
| **Veterinary Medicine and Surgery 520**<br>Clinical Seminar | (0-4) | 1 |
| **Veterinary Medicine and Surgery 521**<br>Reproductive Diseases | (2-0) | 2 |
| **Veterinary Medicine and Surgery 524**<br>Operative Surgery of Small Animals | (1-2) | 2 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (2-2) | 3 |
| **Veterinary Public Health 536**<br>Infectious Diseases of Large Animals | (5-0) | 5 |
| | | 20 |

## FOURTH YEAR

| | | |
|---|---|---|
| **Veterinary Medicine and Surgery 561**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 563**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 565**<br>Large Animal Clinic | (1-7) | 3 |
| **Veterinary Medicine and Surgery 567**<br>Small Animal Clinic | (1-7) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-2) | 3 |
| **Veterinary Parasitology 583**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Pathology 577**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 573**<br>Pharmacy | (0-2) | 1 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-2) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Medicine and Surgery 562**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 564**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 566**<br>Large Animal Clinic | (0-7) | 2 |
| **Veterinary Medicine and Surgery 568**<br>Small Animal Clinic | (0-7) | 2 |
| **Veterinary Microbiology 596**<br>Poultry Diagnosis | (0-2) | 1 |
| **Veterinary Parasitology 584**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Pathology 578**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 574**<br>Pharmacy | (0-2) | 1 |
| **Veterinary Public Health 592**<br>Public Health | (2-2) | 3 |
| | | 16 |

# THE GRADUATE SCHOOL

The principal objective of the Graduate School is to offer education beyond the Bachelor's level to those men who aspire to become intellectual leaders in various professions and in various fields of teaching and research.

## ADMINISTRATION

The faculty of the Graduate School consists of such members of the teaching staff and of the staffs of the Agricultural Experiment Station, the Texas Engineering Experiment Station, the Texas A. and M. Research Foundation, and the Texas Forest Service as the President may appoint on nomination by the Dean of the Graduate School. Appointment to the Graduate Faculty is based on recognized scholarly activity, fundamental research, or professional activity.

The Dean of the Graduate School is the representative of the Graduate Faculty and is responsible for the administration of the academic programs of all graduate students. He administers the policies and regulations set by the Graduate Council and approved by the Academic Council.

The Graduate Council is a standing committee of the Academic Council. It consists of twelve members chosen to give adequate representation to the various parts of the Graduate Faculty. The Graduate Council, acting for the Academic Council, sets the policies and rules by which the graduate programs are administered. Committees on Graduate Instruction are appointed for each of the four degree-granting schools. These committees have general jurisdiction over matters pertaining to graduate work in each of their schools and, through recommendation and representation, participate in the decisions of the Graduate Council.

## ADMISSION

A formal application is required of all persons seeking admission to the Graduate School. The application forms, which are available at the office of the Director of Admissions, should be filed not later than four weeks prior to the opening of the semester. Admission to the Graduate School cannot be granted until all the credentials enumerated in the application form have been filed.

All communications relating to admission should be addressed to the Director of Admissions. Questions on other matters concerned with graduate work should be addressed to the Dean of the Graduate School or to the appropriate subject matter department.

## GRADUATE DEGREES

Graduate courses of study are offered leading to the degrees of:

Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Philosophy (Ph.D.)

The Master of Agriculture, Master of Education, and Master of Engineering degrees offer broader training with less technical specialization. Individual research resulting in a thesis is not included. The 36 semester hours of work required includes specified written reports.

The Master of Science, Master of Business Administration, and Master of Architecture degrees are awarded to students who have received appropriate Bachelor's degrees and have thereafter successfully completed an approved advanced course of study requiring not less than one academic year (32 semester hours) of work.

The degree of Doctor of Philosophy is offered in several fields of basic science with particular emphasis on those fields related to or supporting agriculture and engineering. A student who has received an appropriate Bachelor's degree and has thereafter completed an approved program of advanced study and research may qualify for this degree.

## PROFESSIONAL DEGREES IN ENGINEERING

The professional degrees in engineering are available to graduates of this college. These degrees are offered on the basis of acceptable professional experience, a thesis or its equivalent, and an examination. Details concerning requirements for this degree may be obtained upon application to the office of the Dean of the Graduate School.

## RESIDENCE

The Master's degree will be conferred only after a residence at the College of at least one academic year except that this requirement may be satisfied by residence during five summer terms of six weeks each, or an approved equivalent.

The minimum period of time required for the degree of Doctor of Philosophy is six semesters of full-time graduate study, or its equivalent, beyond the Bachelor's degree. All of the work, except as noted below, must be done in resident graduate study at some approved educational institution, and at least two of the last four semesters must be spent at the Agricultural and Mechanical College of Texas.

Candidates for the Ph.D. degree will normally satisfy residence requirements by either (1) two semesters of 12 hours each, or (2) one semester of 12 hours and one summer session of 12 hours.

Full-time staff members engaged in graduate study and registered for less than 12 semester hours will receive proportionate residence credit.

## GRADUATE SCHOOL BULLETIN

There is published annually as a bulletin of the College an announcement of the work of the Graduate School, in which will be found full information concerning conditions of admission and requirements for degrees, including residence, thesis, and examinations. A copy of this bulletin is available upon request at the Office of the Director of Admissions.

# COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered in the College are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

101 to 199, courses primarily open to freshmen.

201 to 299, courses primarily open to sophomores.

301 to 399, courses primarily open to juniors.

401 to 599, courses primarily open to seniors.

601 to 699, courses primarily open to graduates.

Those undergraduate courses marked at the right by a "†" may be taken for graduate credit.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

## Department of Aeronautical Engineering

Professor A. E. Cronk,
Professors Albert Gail, B. B. Hamner; Associate Professor F. C. Hall;
Instructors W. H. Rudderow, O. D. Wells

**201. Elementary Aerodynamics. (3-3). Credit 4. I, S**

Basic aerodynamic phenomena and simplified theory; elementary aircraft performance. Prerequisites: Mathematics 210 or registration therein; Mechanical Engineering 212 or registration therein; Physics 219 or registration therein.

**301. Theoretical Aerodynamics. (3-0). Credit 3. I**

Fluid statics, kinematics, energy, momentum, similarity, viscosity, boundary layer, drag, circulation, lift, potential flow, thin airfoil theory, high lift devices. Prerequisite: Aeronautical Engineering 201.

**302. Experimental Aerodynamics. (1-3). Credit 2. II**

Wind tunnels and testing techniques. Wind tunnel calibration, airfoil pressure distribution, chord loading, airfoil drag by wake survey, boundary layer. Corrections of wind tunnel data for scale and other effects. Prerequisite: Aeronautical Engineering 301.

**303. High Speed Aerodynamics. (3-0). Credit 3. II**

Airfoil section characteristics and critical Mach Number. Span loading, fundamentals of compressible flow, pressure coefficients, critical conditions, aerodynamic heating, shock waves, compressibility effects, sweepback, and high speed data. Prerequisites: Aeronautical Engineering 301, registration in 302.

**304. Elementary Aircraft Structures. (3-0). Credit 3. I**

Airplane load analysis, external and internal loads and reactions for trusses, beams and space frameworks. Prerequisites: Aeronautical Engineering 201; Civil Engineering 305 or registration therein; Mechanical Engineering 212.

**306. Strength of Aircraft Materials. (2-3). Credit 3. II**

Mechanical properties of materials and their use in design of members subject to tension, compression, shear and bending. Combined stresses and margins of safety. Prerequisites: Aeronautical Engineering 304; Civil Engineering 305.

**401. Aircraft Design. (2-6). Credit 4. I**

Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisite: Aeronautical Engineering 303.

**402. Aircraft Design. (2-6). Credit 4. II**

Structural design of major airframe components, consideration of government airworthiness requirements and customer specifications. Prerequisites: Aeronautical Engineering 401, 405.

**403. Aircraft Materials and Processes. (1-3). Credit 2. I**

Metallography of aluminum alloys, magnesium alloys, steel, nickel alloys, plastics, manufacturing methods, tool design, standards, heat treatment, finishes, factory organization. Prerequisite: Aeronautical Engineering 306.

**405. Aircraft Structures. (3-0). Credit 3. I**

Analysis of thin sheet metal structures, including shells, beams, and compression members subjected to critical loads. Prerequisite: Aeronautical Engineering 306.

**406. Aircraft Power Plant Operation. (2-3). Credit 3. II**

The use of modern instruments for testing aircraft engines, analysis of performance, design study, theory of operation. Prerequisite: Mechanical Engineering 410.

**417. Aircraft Propulsion Systems. (3-0). Credit 3. II** †

A study of the development, fundamentals, theories, construction, design, and performance of turbo-jet, ram jet, pulse jet, and rocket power plants for aircraft. Prerequisites: Aeronautical Engineering 401; Mechanical Engineering 410.

**418. Advanced Aerodynamics. (4-0). Credit 4. II** †

Theoretical and experimental aerodynamics for students majoring in areodynamics. Theory of ideal fluid, viscous effects, compressible flow, and application to design problems. Prerequisites: Must have received at least a grade of B in Aeronautical Engineering 303 and Mathematics 307, or special permission.

**420. Aircraft Vibration and Flutter. (3-0). Credit 3. II**

Analysis of fundamental vibration phenomena with application to aircraft vibration and flutter problem. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**421. Dynamics of Airplanes. (3-0). Credit 3. II** †

Linear theory of vibrations of single and multi-degree of freedom systems; self-excited vibrations. Applications of matrix algebra. Elementary theory of flutter; landing impact, gust response, aero-elastic effects, dynamic stability. Prerequisites: Aeronautical Engineering 401; Mathematics 307 or 308.

**481. Seminar. (1-0). Credit 1. II**

Readings, reports, conferences, and discussion. Prerequisite: Senior classification in aeronautical engineering.

## FOR GRADUATES

**601. Principles of Fluid Motion. (4-0). Credit 4. I**

Mathematical methods of analysis are emphasized. Perfect fluid theory development. Treatment of viscosity and boundary layer phenomena. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**603. Aerodynamics of the Airplane. (4-0). Credit 4. II**

Application of vector analysis to two- and three-dimensional airfoil theory. Viscosity and compressibility. Drag of aircraft components. Static and dynamic stability criteria. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**604. Dynamics of Compressible Fluids. (4-0). Credit 4. I**

Properties of compressible fluids, dynamics of one-dimensional motion, channel flows, shock waves, methods of observation, extension to two- and three-dimensional flow, effects of viscosity. Prerequisites: Aeronautical Engineering 303 and Mathematics 307, or approval of Head of Department.

**605. Aircraft Structural Analysis. (4-0). Credit 4. I**

The classical methods of analysis derived from strain energy and their application to aircraft structural problems. Studies of stresses and strains in aircraft structural arrangements involving thin sheets, sandwich construction, and different materials. Special problems and studies attendant to aircraft column work. Prerequisite: Mathematics 307 or approval of Head of Department.

**606. Aircraft Structural Design. (2-6). Credit 4. II**

Major structural design requirements of high performance aircraft will be studied. New materials and fabrication methods will be considered (magnesium, metalite, material combinations, etc.) Original designs will be undertaken by each student. Prerequisite: Aeronautical Engineering 605.

**607. Aircraft Structural Testing. (1-3). Credit 2. I**

Static and dynamic testing procedures for aircraft structural testing, instruments used, data taking, data analysis, reports. Prerequisites: Aeronautical Engineering 605; Mechanical Engineering 617.

**608. Aircraft Flutter Analysis. (4-0). Credit 4. II**

Theoretical development of the structural and aerodynamic equations for two- and three-dimensional aircraft flutter. Numerical solutions in practical problems to determine flutter velocities. Methods of testing to determine vibration characteristics of aircraft. Prerequisites: Aeronautical Engineering 421 or Mechanical Engineering 459 or 617; Mathematics 307.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in aeronautical engineering.

**691. Research. Credit 2 to 6 each semester. I, II, S**

Technical research projects approved by the Head of the Department.

## Department of Agricultural Economics and Sociology

Professor T. R. Timm,
Professors C. A. Bonnen, R. E. Branson, R. L. Hunt, J. G. McNeely, A. C. Magee, B. H. Nelson, Daniel Russell, R. L. Skrabanek; Associate Professors W. G. Adkins, Harley Bebout, D. R. Davis, V. W. Edmondson, C. A. Moore, H. B. Sorensen, J. H. Southern; Assistant Professors P. E. Hildebrand, J. A. Kincannon, J. E. Miller, F. O. Sargent*, Randall Stelly, K. R. Tefertiller, H. S. Whitney; Instructor S. M. Whitson

### AGRICULTURAL ECONOMICS

**105. Introduction to Agricultural Economics. (3-0). Credit 3. I, II**

The field of agricultural economics and its relationship to other sciences. The characteristics of our economic system and basic economic concepts. Survey of the farm and ranch firm and its organization and management; structure and operation of the marketing sytem; functional and institutional aspects of agricultural finance; governmental policies and programs related to agriculture.

**314. Marketing Agricultural Products. (3-0). Credit 3. I, II, S**

A general introductory course covering all the operations involved in the movement of agricultural commodities from the farmer to the final consumer; including a detailed study of the essential marketing functions of buying, selling, transportation, storage, financing, standardization, pricing, and risk bearing as they are carried out by the middlemen in our marketing system.

**321. Farm and Ranch Records and Accounts. (2-2). Credit 3. I**

Study of methods and systems of recording and analyzing farm and ranch operational data, and acquirement of skill in summarizing and using records as effective aids in more profitable farming and ranching. Laboratory work devoted to problems in keeping and using the various kinds of records and accounts. Prerequisite: Twelve hours of credit in technical agriculture.

**324. Agricultural Prices. (3-0). Credit 3. I**

An analysis of the factors influencing the level of agricultural commodity prices and related nonagricultural prices; major factors affecting prices of individual farm products; their relative importance and behavior; analysis of price trends and seasonal variation; parity prices; methods of forecasting demand and prices of agricultural products; futures trading versus cash market prices. Prerequisite: Economics 203.

**325. Principles of Farm and Ranch Management. (2-2). Credit 3. I, II**

Application of economic and business principles to the organization and operation of farms and ranches. Special attention to the factors influencing business profits. Laboratory work devoted to development of skills in surveying, analyzing, and reorganization of the farm or ranch for more efficient and profitable operation. Actual data from farms and ranches is used. Prerequisite: Twenty hours of credit in technical agriculture.

**404. Agricultural Marketing. (3-0). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in marketing agricultural products, consisting of some of the more common marketing problems confronting Texas farmers and ranchers, and opportunities for and methods of using marketing principles and practices in educational work with farm people. Examples based on actual marketing problems. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

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*Resigned effective December 4, 1959.

**413. Agricultural Cooperatives. (3-0). Credit 3. I** †

Place of cooperatives in our economic system; historical development and principles of cooperative associations. Steps in organizing an agricultural cooperative; operational aspects of cooperatives including legal considerations, financing, management, and membership relations; future role of cooperatives in American agriculture. Prerequisite: Agricultural Economics 314.

**416. Economics of Livestock Marketing. (2-0). Credit 2. I** †

An economic analysis of the livestock and meat industry; marketing practices of livestock producers; characteristics of major agencies and services; problems associated with the movement of livestock from producer to consumer. Prerequisite: Agricultural Economics 314.

**422. Land Economics. (3-0). Credit 3. I, II**

A study of the economic, institutional, and physical factors involved in the utilization and control of natural resources. Prerequisite: Economics 203.

**429. Agricultural Policy. (3-0). Credit 3. II** †

An analysis of the causes, nature, and effects of government participation in agriculture. Emphasis is upon the interrelationship of American agriculture and the political and economic system, public administration and interest representation. Prerequisite: Economics 203.

**430. Agricultural Finance. (3-0). Credit 3. I, II** †

Analysis of the capital requirements for farming and ranching and how they are obtained; principles involved in the use of each type of credit necessary to sound financial management; the risk, costs, and legal aspects of credit; the security requirements, rates, and terms of the loans available from the private and governmental lending agencies serving agriculture. Prerequisite: Economics 203.

**432. Farm and Ranch Organization and Operation. (2-2). Credit 3. II** †

Detailed problems involved in the organization and management of specific farms and ranches, covering such matters as efficiency analysis, budget preparation, layout, and improvement. Prerequisite: Agricultural Economics 325.

**443. Applied Farm Management. (2-2). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in farm management, the use of these principles in farm business planning, consideration of some of the more common management problems confronting Texas farmers, and opportunities for and methods of using the farm management approach in educational work with farm people. Laboratory work based on actual farms and ranches. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**445. Applied Agricultural Policy. (3-0). Credit 3. S**

A special three-week summer course for Extension Service personnel and other professional agricultural workers, covering government functions in agriculture; goals and values of farm people; nature and significance of political and economic institutions; processes in formation and execution of agricultural policy; case studies in special agricultural policy areas; opportunities for and methods in educational work with farm people in the field of agricultural policy. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**452. International Trade and Agriculture. (3-0). Credit 3. II** †

World production and demand, present and potential, of agricultural commodities; world trade in farm products with emphasis on causal factors; national and international policies relating to agriculture; status of agricultural resources, technological progress in agriculture, and food requirements in major areas. The course is designed particularly for those interested in foreign agricultural service with governmental agencies or in export-import work with commercial concerns. Prerequisite: Senior classification.

**481. Seminar. (1-0). Credit 1. I**

Role of the social scientist in the agricultural industry; professional opportunities and responsibilities; individual investigations and reports; discussions with prominent leaders in the field. Prerequisite: Senor classification in agricultural economics or approval of the Head of the Department.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisite: Approval of the Head of the Department and the instructor.

## FOR GRADUATES

**601. Farmers Movements. (3-0). Credit 3. II**

History of efforts of farmers to solve their economic problems. Prerequisite: Approval of the Head of the Department.

**602. Agricultural Marketing. (3-0). Credit 3. I, S**

An analysis of the problems involved in the marketing of farm products. Prerequisite: Agricultural Economics 314.

**603. Land Economics. (3-0). Credit 3. II**

A study of selected problems of the allocation and utilization of natural resources with special reference to government organizations, quasi-government bodies, and other interest groups. Prerequisite: Agricultural Economics 422.

**607. Research Methodology. (3-0). Credit 3. I**

A study of the scientific approach, role of theory and assumptions, bias and prejudice, attributes of problems, methods and tools of agricultural economics and rural sociology research. Each student is asked to critically evaluate research studies and is required to develop his thesis prospectus or its equivalent. Prerequisite: Approval of the Head of the Department.

**611. Production Economics. (3-0). Credit 3. II**

Basic principles upon which problems in agricultural production and resource use can be analyzed. Fundamental principles of production are isolated and these principles applied to agricultural data. Emphasis is placed on the conditions under which efficiency is obtained. The problems of agricultural production and resource use are treated from the standpoint of the technical unit, the firm and society. Prerequisite: Approval of the Head of the Department.

**613. Contemporary Thought in Agricultural Economics. (3-0). Credit 3. I**

A study of contemporary contributions to the thought and analyses of aggregate relationships and problems in the agricultural economy in terms of organizational efficiency and patterns in adjusting to economic development and economic fluctuations. Prerequisite: Approval of the Head of the Department.

**614. Agricultural Policy. (3-0). Credit 3. S**

An analysis of public policies and programs affecting agriculture. Development of policies and programs for agriculture and their bases. Prerequisite: Agricultural Economics 429 or approval of the Head of the Department.

**617. Consumer Economics. (3-0). Credit 3. I**

An analysis of the consumer market for agricultural products; effects of family characteristics, such as size, age, income, and location upon consumer preferences and buying habits; motivations of consumers in buying different products; effectiveness of quality variation, packaging, and displays upon consumer purchases; the place of advertising in market creation; price policies at the retail level; and market research as a guide to marketing policies. Prerequisite: Approval of the Head of the Department.

**619. Farm and Ranch Business. (2-2). Credit 3. I**

An analysis of the interrelationships of factors affecting profits in farming and ranching. Identification of the strong and weak points in the organization and management of actual farm and ranch businesses. Special study and analysis of the management factor affords an opportunity to relate theory and practice in farming and ranching. Prerequisite: Approval of the Head of the Department.

**620. Agricultural Finance. (3-0). Credit 3. S**

Scope of agricultural finance and problems of financing agriculture. Role of credit in agriculture; costs of credit; bases used in extending credit to agricultural producers; payment methods, and legal aspects of agricultural credit. Methods of protecting farm and ranch capital; analysis of agricultural loans; analysis of private and public agricultural credit agencies. Prerequisite: Agricultural Economics 430 or approval of the Head of the Department.

**627. Agricultural Price Analysis. (3-0). Credit 3. S**

Agricultural prices viewed in the light of current economic theory; the application of economic theory to an analysis of agricultural product price determination and price behavior; economic theory as a tool in designing and evaluating governmental price programs for agriculture; consideration of various types of applied economic and statistical research for price analysis and price forecasting. Prerequisites: Agricultural Economics 324; Business Administration 303.

**641. Agricultural Statistics. (2-2). Credit 3. II**

Planning the statistical research project, developing forms, selecting the sample, conducting the study, tabulating, analyses, and interpreting the data. Prerequisites: Business Administration 303 or Genetics 406 or equivalent; 15 hours of social science; approval of the Head of the Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A review of current literature, preparation of papers on selected topics, and discussion with visiting agricultural economists. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of agricultural economics. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the Head of the Department.

## RURAL SOCIOLOGY

**205. Principles of Sociology. (3-0). Credit 3. I, II, S**

The basic principles fundamental to an understanding of human relations are analyzed. Students are familiarized with the scope and objectives of sociology and rural sociology. The contributions of biology, geography, group life, and culture and their interrelationships in contributing to the development of personality are reviewed. Attempts are made to instill an appreciation for the complex processes of invention and social evolution which have produced our social systems and culture.

**206. Social Institutions and Processes. (3-0). Credit 3. II**

Sociological concepts and principles that are basic to an understanding of the complexity of modern society. Students, through first hand observation and course materials, are familiarized with social institutions, class structure, and social processes which produce social organization and disorganization. Major social institutions are viewed through the standpoint of social structure and social processes and their future roles in society's operation and influence upon the individual and groups.

**304. Criminology and Juvenile Delinquency. (3-0). Credit 3. I, II, S**

Extent and cost of crime. Causes of crime. Processes of criminal behavior. Ecology of crime. Theories of criminology and penology. The police system. Criminal and juvenile courts, the indeterminate sentence, and pardon. Punishment and treatment of criminals and juvenile delinquents. Prison systems and reformatories. Probation and parole. Recidivism and reformation. Prevention of crime. Prerequisite: Junior classification or 3 hours of social science.

**306. Principles of Social Work. (3-0). Credit 3. II, S** †

The historic development and present organization of private and public welfare agencies and social services. Distinctive techniques of the social work profession in interviewing, group work, case work, and social work organization are emphasized. Students are prepared to assume intelligent leadership on committees and boards of welfare agencies and to explore the possibilities for professional employment in this 20 billion dollar enterprise. Twelve hours of independent field work must be performed if graduate credit is allowed. Prerequisite: Rural Sociology 205 or 6 additional hours of rural sociology or other social science.

**311. Social Psychology. (3-0). Credit 3. I, II, S** †

An analysis of why people behave the way they do. The effect of social experiences and of the groups people belong to upon the development of personality. How to influence and control the behavior of people. Social adjustment and maladjustment including analysis of causes. Public opinion. Prerequisite: Three hours of sociology or psychology.

**314. Social Problems. (3-0). Credit 3. I**

Significant social problems are explored from the standpoint of the social, economic, political, and physical implications operating to produce the swift impact of social change in a dynamic society. Both academic and practical adjustments or solutions to major problems are considered at the local, state, and national levels so that the student may be better equipped to assume the responsibilities of good citizenship in meeting the problems of today. Prerequisite: Rural Sociology 205 or approval of the Head of the Department.

**315. The Family. (3-0). Credit 3. I, II**

A study of the evolution and growth of the family as the most fundamental social institution. Basic scientific research will be used to throw light on the problems of family formation, courtship, engagement, marriage, etc. Family problems, social and personal adjustment, financing, child rearing are emphasized. Prerequisite: Junior classification or 3 hours of social science.

**320. Social Anthropology. (3-0). Credit 3. I**

Rise, development, and spread of man's attempts at group living with emphases on the principal cultures and sub-cultures of the world. The common denominators of all cultures are studied to discover the means for mutual understanding and acceptance of human relations in the development of business, industry, commerce, and agriculture in foreign countries. Designed especially for students in agriculture, business, and engineering who contemplate either domestic or overseas employment. Prerequisite: Rural Sociology 205 or 6 hours of social science.

**404. Rural Community Development. (3-0). Credit 3. I** †

The objective of the course is to help future agricultural workers in doing a better job in their various specialties by recognizing and understanding group processes and organization in carrying on their program. The techniques of rural community development are explored as values to total agricultural and small town development. Community development problems in underdeveloped countries will be surveyed. Prerequisite: Approval of the Head of the Department.

**407. Human Relations in Agriculture. (3-0). Credit 3. I, II, S**

This course is designed chiefly for students in technical agriculture to help them gain broader understanding of the human factors involved in a dynamic agricultural situation. This involves the analysis of interpersonal relationships, group relationships, and institutional relationships in a rapidly changing environment.

**408. Organization for Boy Scout Work. (2-0). Credit 2. II**

History and development of the Boy Scout movement. Understanding the boy and fitting a program to meet his needs. Developing adult leaders in the boy-man institutional relationship. Specialized programs such as cubbing, senior scouting, sea scouting, etc. Fitting scouting to the boy's needs and life pattern.

**412. Population Analysis. (3-0). Credit 3. II** †

Methods of demographic analysis. The influence of population numbers, birth rate, death rate, sex ratio, age composition, nativity, racial composition, and migration on social values and social structure. Theories of population growth and change and their effects on population policies. International aspects of the demographic position of the United States. Prerequisites: Twelve hours of social science; approval of instructor.

**418. Public Opinion and Social Control. (3-0). Credit 3. I** †

Analysis of processes, planned or unplanned, by which individuals are taught, persuaded, or compelled to conform to usages and life values of groups. Nature and use of public opinion and propaganda. Prerequisite: Rural Sociology 205.

## FOR GRADUATES

**601. Rural-Urban Relations. (3-0). Credit 3. I, S**

Recognition of the social causation of social problems in rural, urban, and rurban areas and the development of a scientific attitude for problem analysis. The specific relation of events to cultural context in which they had their birth is emphasized. Students are familiarized with the common tools that are used in collecting data for problem analysis and the steps in collecting, organizing, and analyzing data regarding social situations that violate the system of social values. Prerequisites: Rural Sociology 205 or its equivalent or 12 hours of social science*.

**602. Contemporary Theory in Rural Sociology. (3-0). Credit 3. II**

The rise, spread, and development of the field of rural sociology in each of its three central phases—teaching, research, and extension. An objective appraisal of the scientific status of rural sociology and its interrelationships with other sciences. A review of the theories and contributions of past and present-day leading sociologists and other social scientists to the field of rural sociology. Prerequisite: Rural Sociology 205 or its equivalent, or 12 hours of social science*.

**606. Rural Youth Leadership. (4-0). Credit 4. I, S**

To give special insight into the problems of our youth, and training techniques and programs needed to deal with these problems. To acquaint the advanced student with qualities, traits, techniques, attitudes, etc. of successful leaders in various fields. Prerequisite: Twelve hours of social science*.

**611. History of Social Thought. (3-0). Credit 3. I, S**

The development of social thought from ancient times to the present. Chief emphasis is placed upon sociological thinkers who have made significant contributions to the field, the theories of these men, and the background from which these theories evolved. Prerequisites: Rural Sociology 205; 12 additional hours of social science*.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**612. The Rural Community. (4-0). Credit 4. II**

The purpose of this course is to acquaint the advanced student with the importance, problems, processes, and techniques of community development. Each student will be given an outside reading and study program to meet his particular interest and needs in his chosen field or specialty. A major purpose is to recognize the community development self-help technique as an effective method of improving rural standards of living in agriculture, health, education, recreation, beautification, etc. Prerequisite: Twelves hours of social science*.

**618. Educational Sociology. (3-0). Credit 3. S**

How our school system can strengthen our democratic way of life. The relationship of education to social organization, social change, and social control. Sociological analysis of the role of education in our society. Prerequisites: Rural Sociology 205 or the equivalent; 9 additional hours of social science or a degree in education.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of rural sociology. Prerequisite: Six hours of rural sociology or 12 hours of supporting social science.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the instructor.

## Department of Agricultural Education

Professor E. V. Walton,
Professor Henry Ross**; Associate Professors R. N. Craig, J. D. Gray, O. M. Holt, J. R. Jackson, E. H. Knebel; Assistant Professors C. G. Anderson, Jr., B. D. Cook, C. M. Laywell

**301. Principles of Agricultural Education. (3-0). Credit 3. I**

An introduction to the study of agricultural education, designed to acquaint the student with the principles of education theory, the aim and meaning of education, leadership training, professional organizations, and literature. Organization and operation of Future Farmer chapters.

**425. Course Building. (2-0). Credit 2. II** †

Preparing units of instruction in vocational agriculture for all-day, part-time, and evening school classes.

**426. Methods in Adult Agricultural Education. (2-0). Credit 2. II** †

Planning educational programs and activities for adult farm people in young farmer and adult classes. Developing skill in the use of the group process in teaching.

**427. Methods of Developing Farming Programs. (1-2). Credit 2. II** †

Planning and supervising farm programs of vocational agriculture students.

**431. Student-Teaching in Vocational Agriculture. (2-0). Credit 2. I**

Student teaching preparation including orientation in professional ethics and behavior. Selection and use of reference materials and audio-visual aids. Preparation of teaching plans for units of instruction to be taught in selected high school vocational agriculture departments.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**On leave of absence.

**432. Student-Teaching in Vocational Agriculture. (2-6). Credit 4. II**

Planning for and teaching vocational agriculture in selected high school departments in Texas. Six weeks student teaching and observation in local departments of vocational agriculture. Presentation and discussion of problems encountered by practice teachers in the field. A study of current problems in teaching vocational agriculture. Prior planning required. Laboratory hours to include the six weeks student teaching.

**441. Agricultural Extension Organization and Methods. (2-2). Credit 3. I, II, S**

Cooperative agricultural extension service, objectives, organization and administration, operation, results, social and economic significance. Analytical approach to farm and home problems. Principles of extension teaching and measuring results. Methods in selecting, training, and using farm leaders. Principles in dealing with practical problems of planning, developing, and executing county programs. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of vocational agricultural education or extension education with emphasis on the collection, analysis, and presentation of information. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

(One year of acceptable experience and Agricultural Education 425, 426, 431, 432, or their equivalents are prerequisites to the following courses unless otherwise noted.)

**601. Advanced Methods in Agricultural Education. (3-0). Credit 3. I, II, S**

An advanced course in methods of teaching vocational agriculture.

**605. Supervised Farming. (3-0). Credit 3. I, II, S**

Advanced study of supervised farming in vocational agriculture and methods of supervising students in carrying out supervised farming programs.

**607. Future Farmer and Young Farmer Activities. (3-0). Credit 3. I, II, S**

Methods of conducting Future Farmer and young farmer activities.

**610. Methods in Adult and Young Farmer Education. (3-0). Credit 3. I, II, S**

A study of the methods of determining educational program needs, organizing, conducting and evaluating educational programs in agriculture for adult and young farmer groups. Emphasis on coordinating and utilizing groups and resources in a community in developing agricultural programs. Suitable for teachers of vocational agriculture, county agricultural extension agents, and other professional agriculture workers. Prerequisite: Professional experience or approval of Head of the Department.

**613. Administration and Supervision of Agricultural Education. (3-0). Credit 3. I, II, S**

Problems of organization, administration, financing, and supervision of vocational agriculture, and extension work.

**615. Philosophy of Agricultural Education. (3-0). Credit 3. I, II, S**

A study of the philosophy and evaluation of agricultural education. Emphasis on the development and use of evaluative criteria and tests in the field of vocational education in agriculture.

**616. Program Building in Agricultural Education. (3-0). Credit 3. I, II, S**

Organization of programs in agricultural education on local, state, and national basis. Securing assistance of public school administrators, farmers, and county, state, and national agricultural agencies in program building.

**619. Workshop in Agricultural Education. Credit 1 to 3. I, II, S**

A workshop offered on a one-, two-, or three-week basis to study selected problems in the areas of agricultural or extension education. Committees are set up to utilize consultants in specialized areas of study. Prerequisite: Professional experience or approval of Head of the Department.

**630. Guidance and Counseling for Rural Youth. (3-0). Credit 3. I, II, S**

Analysis of occupational and vocational opportunities for rural youth, techniques of individual group counseling and guidance. Practicum in personality and occupational interest testing. Prerequisite: Approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Studies related to classroom, laboratory, supervised farming, and adult education activities. For Master of Education programs only.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis for Master of Science programs only.

## Department of Agricultural Engineering

Professor Price Hobgood,
Professors W. E. McCune, J. W. Sorenson; Associate Professors O. R. Kunze,
E. T. Smerdon, L. H. Wilkes; Assistant Professors W. H. Aldred,
C. M. Hohn; Instructors B. R. Stewart, D. R. Stipe

**201. Farm Power and Machinery. (2-2). Credit 3. I, II**

Construction, operation, adjustment, and servicing of farm engines and tractors. Adaptability, selection, economic utilization, construction, operation, and adjustment of the principle tillage, planting, cultivating, harvesting, and feed processing machines.

**205. Materials in Farm Structures. (2-3). Credit 3. I**

Selection and utilization of materials for light structures. Specifications and cost estimation. Prerequisite: Engineering Drawing 105.

**208. Farm Machinery. (3-3). Credit 4. II**

The application of engineering principles to the design, construction, operation, and adjustment of all types of farm machinery. Prerequisite: Physics 218.

**213. Food Plant Engineering. (2-3). Credit 3. II**

Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.

**221. Farm Shop. (1-3). Credit 2. I**

A course for students in agricultural education and general agriculture involving carpentry and woodwork, tool sharpening, preparation of simple drawings and bills of materials, blueprint reading, and rafter cutting.

**222. Farm Shop. (1-3). Credit 2. I, II**

A course for students in agricultural education and general agriculture involving electric and gas welding, cold metal work, forging, soldering, pipe fitting, and the preparation and use of concrete.

**324. Automotive Machinery. (3-3). Credit 4. II**

A study of the thermodynamic principles, operation, and construction of internal combustion engines. Also fuels, carburetion, ignition, lubrication, and cooling systems. Testing, rating, and determining the economic applications of farm engines. Prerequisite: Mechanical Engineering 323.

**325. Farm Electricity. (2-2). Credit 3. I, II**

A course for students in agricultural education and general agriculture which covers elements of electric current generation and transmission, farm applications of electric heating, lighting and power, wiring motors, power rates, meter reading, safety rules and regulations.

**335. Water Control and Utilization. (2-3). Credit 3. I, II**

Elementary surveying, including chaining, leveling, and mapping as applied to farm needs. Water control and utilization emphasizing irrigation principles and practices, associated problems of drainage, and fundamentals of terracing and farm pond design.

**410. Irrigation and Drainage Engineering. (2-3). Credit 3. II** †

Principles of farm drainage as applied to open ditches and tile drains; drainage districts and laws; land clearing and reclamation methods. Principles of irrigation practice; sources of water supply; distribution systems; application of water to crops; measurement and duty of water; alkali control. Prerequisites: Civil Engineering 201, 311.

**413. Farm Structures Design. (2-3). Credit 3. II** †

Structural problems in farm building design. Functional planning of farm buildings with respect to economy, convenience, sanitation, and appearance. Prerequisites: Agricultural Engineering 205; Civil Engineering 305.

**418. Agricultural Process Engineering. (2-3). Credit 3. I** †

Engineering principles and their application to product drying and storage, materials handling, flow rate measurement, conditioning air, refrigeration, instrumentation, fans, sorting and size reduction. Prerequisite: Mechanical Engineering 323.

**428. Soil and Water Conservation Engineering. (2-3). Credit 3. I** †

Principles of engineering practice as applied to soil and water conservation, including runoff, terrace and terrace outlet design and construction; proper cultural and tillage practices and related topics. Prerequisites: Civil Engineering 201, 311 or registration therein.

**430. Farm Electrification Engineering. (2-3). Credit 3. II** †

The fundamentals of alternating currents, circuits, and equipment, including a study of resistance, inductance, capacitance, power factor, motors, and controls as related to the economics of power consumption on the farm and in rural communities.

**440. Farm Electrification. (3-0). Credit 3. S** †

This course includes the fundamentals of farm wiring, lighting and the design, construction, and operation of electric water systems, refrigeration equipment, brooders, milking machines, feed processing and handling equipment, hay and grain driers, and other electric equipment used in farm production. This is a special course for teachers and prospective teachers in vocational agriculture to be offered for a three-week period during the summer.

**481. Seminar. (1-0). Credit 1. I** †

A review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.

**482. Seminar. (1-0). Credit 1. II** †

Presentation of papers dealing with new developments and results of investigations of problems related to agricultural engineering. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Instrumentation and Research Methods. (3-0). Credit 3. I, II**

Analysis of research techniques, study of the theory and use of instruments in research including instrumentation for research in irrigation and drainage and other phases of agricultural engineering. Also the design and use of research models and analogies, and an introduction to available research facilities. Prerequisite: Admission to Graduate School.

**602. Irrigation and Drainage. (3-0). Credit 3. I, II**

Theory and practice in irrigation and drainage including soil moisture and moisture movement, soil moisture measurements, erosion and sedimentation of irrigation and drainage structures, and characteristics of pumps. Also includes effect of low quality irrigation water, salinity and alkali problems and their control, efficiency of irrigation water usage, drainage methods, and legal aspects of irrigation and drainage. Prerequisite: Agricultural Engineering 410 or the equivalent.

**603. Agricultural Machinery. (3-3). Credit 4. I, II**

The theory and practice of functional farm machinery design. Encompasses an analysis of the problem need, the functional requirements, the common materials used, the design, testing and production of efficient operational units.

**605. Agricultural Structures. (3-0). Credit 3. I, II**

A study of the structural, environmental, and economic problems encountered in agricultural buildings with special emphasis on design considerations for structural materials. Also research methods and procedures as they apply to agricultural structures. Prerequisites: Agricultural Engineering 205, 413, 418.

**606. Agricultural Process Engineering. (3-0). Credit 3. I, II**

Basic engineering principles involved in mechanical handling, cleaning and sorting, size reduction, conditioning and storage of agricultural products. Includes the use of refrigeration, electric energy, and radiation. Prerequisites: Agricultural Engineering 418, 430; Mechanical Engineering 323.

**609. Farm Power. (3-3). Credit 4. I, II**

A study of the basic theory and principles of operation as applied to internal combustion engines used for agriculture. Emphasis is given to the application and functional design requirements and testing procedures. Prerequisites: Agricultural Engineering 324; Mechanical Engineering 323.

**613. Soil and Water Conservation Engineering. (2-3). Credit 3. I, II**

A study of soil and water conservation, with emphasis on the hydrology of agricultural watersheds, soil erosion theory, functional design of soil and water conservation structures, methods of reducing water losses, and experimental techniques. Prerequisites: Agricultural Engineering 428; Civil Engineering 463.

**685. Problems. Credit 1 to 4 each semester. I, II**

Advanced laboratory or field problems not related to student's thesis. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Research for the thesis or dissertation.

## Department of Agronomy

Professor W. O. Trogdon,
Professors I. M. Atkins, M. S. Brown, L. C. Coffey, J. F. Fudge, H. E. Hampton, E. C. Holt, T. E. McAfee, J. B. Page, R. C. Potts, I. P. Trotter*;
Associate Professors M. E. Bloodworth, A. G. Caldwell, C. L. Godfrey,
G. W. Kunze, E. L. Whiteley; Assistant Professors J. E. Endrizzi,
J. F. Mills, K. H. Patrick, R. D. Staten; Instructor R. B. Metzer

**105. Fundamentals of Crop Production. (2-2). Credit 3. I, II**

Classification and distribution of farm crops; importance of good varieties and good seed; crop improvement; preparation of the seed bed; commercial fertilizers; manures and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies.

**301. Introductory Soils. (3-2). Credit 4. I, II, S**

An introductory course designed to acquaint the student with the field of soil science. Some of the basic principles of the physical, chemical, and biological properties of the soil and their general applications are covered. Prerequisite: Chemistry 102.

**305. Seed Technology and Commercial Grading. (2-3). Credit 3. II**

A study of the important crop seeds with emphasis on harvesting, cleaning, and storage as they influence quality of planting seed. The grading of grain, cotton and hay according to Federal standards. Prerequisites: Agronomy 105; Biology 101.

**306. Grain and Fiber Crops. (3-2). Credit 4. I**

A study of the geographical distribution, classification, physiology, principles of production, and use of the grain and fiber crops. Prerequisites: Agronomy 105, 301; Biology 101.

**308. Forage Crops. (2-2). Credit 3. I, II**

The production, utilization, and identification of the major forage crop plants with emphasis on adapted species and varieties for the Southwest. Prerequisites: Agronomy 105, 301; Biology 101.

**310. Soil Morphology. (1-3). Credit 2. II**

Field study of the morphological features of the soil profile in relation to soil utilization and management. Soil development, classification, and mapping are also covered. Prerequisite: Agronomy 301.

**318. Soil Conservation. (3-3). Credit 4. I, II, S**

A course dealing with the importance of soil conservation from the standpoint of different soil types in the agricultural regions of Texas and the United States. Conservation methods are presented according to climatic regions, cropping systems, topographic locations, and other influencing factors. Field practice in the making of a map of a farm, its soil, and a plan of reorganization for soil conservation. Prerequisite: Agronomy 301.

**413. Soil and Crop Management. (3-0). Credit 3. II** †

A study of the special problems in the utilization and management of soils and crops under varying soil and climatic conditions. Independent work in solving current agronomic problems in different parts of the Southwest required. Prerequisites: Agronomy 301; senior classification.

**417. Pasture Management. (2-2). Credit 3. I, II** †

Adaptation and management of native and introduced pasture plants; their establishment, production, utilization, and maintenance in permanent and temporary pastures. Field trips are required. Prerequisites: Agronomy 301, and either Agronomy 308 or Range and Forestry 303.

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*Retired effective January 16, 1960.

**422. Soil Fertility. (3-4). Credit 4. I, S** †

An advanced course dealing with the more technical consideration of the physical, chemical, and biological factors influencing the crop producing power of the soil. Prerequisites: Agronomy 301; Chemistry 223, 231; Plant Physiology and Pathology 313.

**426. Fertilizer Technology. (2-0). Credit 2. II**

A study of the problems of the manufacture, storage, and application of commercial fertilizers, including a limited number of required field trips to various types of fertilizer plants. Prerequisites: Agronomy 301; 14 hours of chemistry and/or physics.

**428. Turf Management. (2-2). Credit 3. II**

A study of the fundamental and special problems in the establishment, utilization, and management of turf grasses under varying use conditions. Field trips are required. Prerequisites: Agronomy 301; Plant Physiology and Pathology 301, 313.

**445. Soil Physics. (2-3). Credit 3. I** †

A study of the fundamentals of soil physics and their application to the solution of problems in crop production, irrigation, and engineering. Prerequisites: Nine hours of soils and physics, with a minimum of three hours of each (may include soil mechanics).

**481. Agronomy Seminar. (1-0). Credit 1. I, II**

The preparation and presentation by the students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit field or laboratory investigations or the study of subject matter not included in established courses. Prerequisites: Ten hours of junior and senior agronomy.

## FOR GRADUATES

**601. Advanced Cereal Crops. (3-4). Credit 4. II**

An advanced study of cereal production and breeding, including a critical review of world literature reporting recent investigations in this field.

**602. Advanced Forage Crops. (3-4). Credit 4. I**

An advanced study of forage production and breeding, including a critical review of world literature reporting recent investigations in this field.

**605. Pedology. (3-0). Credit 3. I**

An advanced study of the development, morphology, constitution, and classification of soils.

**617. Advanced Soil Physics. (3-3). Credit 4. II**

The physical constitution and properties of soil, including consistence and structure, aeration, soil water, and thermal relationships. Prerequisites: Agronomy 445 or the equivalent and a two-semester course in physics. (Offered in 1960-61 and in alternate years thereafter)

**618. Advanced Soil Analysis. (2-3). Credit 3. II**

A course designed to familiarize the student with the more difficult problems of soil analysis and the interpretation of the data. Prerequisite: Agronomy 422. (Offered in 1959-60 and in alternate years thereafter)

**624. Physical Chemistry of Soils. (3-3). Credit 4. I**

The physical chemistry of clay minerals and the inorganic and organic soil colloids. Prerequisites: Agronomy 617, 618; Chemistry 323, 324. (Offered in 1960-61 and in alternate years thereafter)

**626. Soil Mineralogy. (3-3). Credit 4. I**

A study of the crystal structures and properties of the more important agricultural and industrial clays combined with identification techniques involving X-rays, differential thermal analysis, and electron microscopy. (Offered in 1959-60 and in alternate years thereafter)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A seminar for graduate students and staff members in soils and crops. Presentation and discussion of special topics and research data in the field of agronomy. Participation is required of all graduate students in agronomy.

**685. Problems. Credit 1 or 2 each semester. I, II, S**

Advanced problems in some phase of agronomy not directly related to the thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the thesis or dissertation.

## Department of Air Science

C. E. Gregory, Colonel, USAF
Professor of Air Science

## UNITED STATES AIR FORCE

Associate Professors: Lieutenant Colonel W. F. Barnard, Jr.; Majors C. B. Wells, Jr., Kenneth Wolf; Assistant Professors: Captains D. E. Allen, W. F. Atwater, J. M. Bennett, Jr., E. J. Briggs, G. S. Coffin, Jr., S. D. Goode, E. H. Higgins, Truett Hudson, J. B. Killebrew, P. D. Weihs, H. F. Weitzel, Jr., G. F. Williams; Administrative Personnel: Captain B. T. Duncan; Master Sergeants H. H. Allen, C. L. Thompson; Technical Sergeants J. B. Daniel, R. E. McElroy, O. E. Millican; Staff Sergeants D. R. Bradley, Albert Novak, Jr., E. N. Rutherford, M. K. Wilson

### BASIC COURSE OF AIR SCIENCE

**141. First year Basic Air Science. (0-3). Credit 1. I**

Theoretical: Foundations of air power. A general survey of air power designed to provide the student with an understanding of the elements and potentials of air power to include: fundamentals of air power; military air power of the world; military research and development; air vehicle industries; airlines and airways; general aviation; elements of an aircraft; aerodynamics.

Practical: Drill—basic military training.

**142. First Year Basic Air Science. (0-3). Credit 1. II**

Theoretical: Foundations of air power. A general survey of air power to include: control and navigation; propulsion systems; space vehicles; military instruments of national security; professional opportunities in the USAF.

Practical: Drill—basic military training.

**241. Second Year Basic Air Science. (0-3). Credit 1. I**

Theoretical: A more advanced consideration of air power to include: principles of warfare; evolution of aerial warfare; weapons systems development.

Practical: Drill—basic military training and non-commissioned officer training.

**242. Second Year Basic Air Science. (0-3). Credit 1. II**

Theoretical: Continuation of Air Science 241 to include USAF operations in peacetime and wartime and the future of air power.

Practical: Drill—basic military training and non-commissioned officer training.

### ADVANCED COURSE OF AIR SCIENCE

**301. Officer Development. (0-2). Credit 1. I**

First semester advanced air science. A study of the functions of the commander and his staff, including Air Force conferences, staff meetings, and correspondence. Concurrent enrollment in English 210 and English 401 (or 403) is a requirement for this course.

Leadership laboratory: Development of leadership skills dealing with larger and more complex groups (i.e., groups and wings) and an introduction to command and staff principles and methods at all levels. The cadet is provided with an opportunity to assume full responsibility for significant parts of the cadet corps program.

**342. Officer Development. (2-3). Credit 3. II**

Theoretical: Continuation of Air Science 341 to include: the military justice system; principles of leadership and management; the Air Base; preparation for summer training camp.

Practical: Leadership laboratory—cadet officer training.

**401. Officer Development. (0-2). Credit 1. I**

Third semester advanced air science. An introduction to weather and air navigation for the Air Force officer. Concurrent enrollment in History 318 or Geography 401 is a requirement for this course. (If History 318 is taken during the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership laboratory: Development of leadership and management understandings and skills at the command level. The cadet is given an opportunity to plan for the achievement of group objectives and supervise the implementation of cadet planning by coordination and control through cadet corps command and staff channels.

**402. Officer Development. (0-2). Credit 1. II**

Fourth semester advanced air science. Presentation of material to help the cadet make a rapid, effective adjustment to active duty as an officer of the United States Air Force. Concurrent enrollment in History 318 or Geography 401 is a requirement for the course. (If History 318 is taken the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership laboratory: Continuation of Air Science 401 laboratory.

## Department of Animal Husbandry

Professor O. D. Butler, Jr.,
Professors R. O. Berry, T. C. Cartwright, F. I. Dahlberg, Fred Hale, H. O. Kunkel, J. K. Riggs, T. D. Watkins, Jr.*; Associate Professor A. M. Sorensen, Jr.; Assistant Professors W. T. Berry, G. T. King, L. D. Wythe, Jr.; Instructor C. F. Parker

**107. General Animal Husbandry. (2-3). Credit 3. I, II**

An introductory course stressing the importance of livestock and livestock farming. General factors influencing efficiency in feeding, market value, breeding, health, and adaptability of various species to geographical and climatic regions are emphasized.

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*On leave of absence.

**302. Trends in Livestock Selection. (2-2). Credit 3. II**

The natural selection of livestock in the wild state. Domestication and adaptation to different environments. The breed concept. Balancing visual selection, pedigree, and records of performance. Prerequisite: Animal Husbandry 107.

**303. Animal Nutrition. (3-0). Credit 3. I, II**

Chemical composition of feeding stuffs; composition of farm animals; digestion; metabolism and the function of nutrients; minerals; vitamins; antibiotics, hormones, and other regulators in feeds. Prerequisite: Chemistry 231 or 227.

**307. Meats. (2-3). Credit 3. I, II**

Study and practice of slaughtering and cutting carcasses of cattle, sheep, and hogs. Meat will be cured and meat products prepared. Uses of byproducts will be considered. Factors affecting quality, palatability, and economy in selection of meats will be included. The location, structure, and functions of the endocrine glands, digestive organs, and reproductive organs will be discussed in the laboratory in connection with slaughtering. Prerequisite: Animal Husbandry 107.

**313. Horse Management and Training. (1-2). Credit 2. I**

Breeding, feeding, management, and training of quarter and pleasure horses; growing and developing foals; anatomy; unsoundness; parasites and diseases; stables and equipment; shoeing; fitting for show and sale. Prerequisite: Animal Husbandry 107 or approval of Head of Deartment.

**315. Livestock Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of livestock for both breeding and slaughter purposes.

**317. Meats Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb.

**320. Animal Nutrition and Feeding. (3-0). Credit 3. II**

A review of the chemical aspects of animal nutrition. The role of carbohydrates, fats, proteins, vitamins, and minerals in animal nutrition. Nutritional requirements of farm animals. Formulation of rations. A study of feeds and feedstuffs which supply the nutritional requirements. For students of veterinary medicine. Prerequisite: Biochemistry and Nutrition 312.

**406. Beef Cattle Production. (2-2). Credit 3. I, II** †

Systems of production; establishing a breeding herd; mating and reproduction; performance and progeny records for selecting breeding stock; feeding and managing the breeding herd; systems of managing stockers and feeders; fattening cattle for market; farm steer beef production and commercial feedlot finishing; planning commercial and purebred cattle enterprises; fitting and showing; animal health; marketing. Prerequisite: Animal Husbandry 303.

**409. Feeds and Feeding. (2-2). Credit 3. I, II**

A course designed to cover plans for feeding all classes of farm animals from a practical point of view; application of principles of nutrition; computing rations; economics of livestock feeding; flexible feeding programs; utilization of by-product feedstuffs; feeding investigations; feed control laws, animal feed budgets. Prerequisite: Animal Husbandry 303.

**412. Swine Production. (2-2). Credit 3. I** †

Historical; feeding and handling the breeding herd during various seasons; culling; records; the sow and the litter; growing and fattening pigs; forage crops; feeding on forage; dry lot feeding; choice and value of feeds; garbage feeding; prevention of disease; the purebred herd; fitting and showing. Prerequisite: Animal Husbandry 303.

**414. Sheep, Goats, and Fiber Technology. (3-2). Credit 4. II**

Methods of management; selection and culling; environmental factors affecting kid and lamb production; care and feeding of lambs, kids and breeding stock; marketing of sheep and goat products. Wool and mohair; grades and lengths; physical and chemical properties; processing; judging and appraisal. Prerequisites: Animal Husbandry 303; junior classification; approval of Head of Department.

**416. Livestock Management. (1-2). Credit 2. II**

A course in the feeding and management of beef cattle, sheep, swine, and horses. Especially designed for agricultural education majors. Prerequisite: Animal Husbandry 303.

**433. Reproduction in Farm Animals. (2-2). Credit 3. I, II** †

Anatomy and physiology of the male and female reproductive tracts; hormones governing reproduction; pregnancy tests; estrus and the estrous cycle; ovulation; mating; gestation; parturition; lactation; sperm physiology; collection, storage, and dilution of semen; artificial insemination; factors affecting fertility; causes of sterility in males and females. Prerequisite: Senior classification or approval of Head of Department.

**437. Marketing and Grading of Livestock and Meats. (2-2). Credit 3. I, II**

Factors determining market classes and grades of feeder, stocker, and slaughter animals; grading feeder, stocker, and slaughter animals; marketing machinery and handling market livestock; purebred sales; shipping losses; shrinkage; fills. Prerequisite: Senior classification.

**440. Sheep and Wool Production Problems. (2-3). Credit 3. S**

Latest developments in the feeding, breeding, and management of the sheep flock including the production, harvesting, preparation for market, and marketing of the wool clip. Special summer course for agricultural agents.

**442. Advanced Livestock Judging. (0-3). Credit 1. II**

An advanced course in the selection and grading of livestock. Prerequisite: Animal Husbandry 315 or approval of Head of Department.

**444. Large Animal Nutrition. (3-0). Credit 3. II** †

Review of elementary chemistry of carbohydrates, proteins, and fats, with particular emphasis on the role of these constituents in large animal nutrition. A comparison of the nutrition of the ruminant to that of the monogastric animal. A study of the secretions (enzymatic and hormonal) of large animals and the function of each. The efficiency of each class of animals with regard to converting feed into fats, meat, wool, and work. Prerequisite: Animal Husbandry 303 or approval of Head of Department.

**447. Advanced Meat Selection. (0-3). Credit 1. II**

An advanced course in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb. Prerequisite: Animal Husbandry 317 or approval of Head of the Department.

**481. Seminar. (1-0). Credit 1. I, II**

A review of current literature and research problems related to the livestock industry. Prominent men in the field of animal husbandry may be invited to conduct the seminar. For senior students in animal husbandry.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of animal husbandry. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**600. Advanced Livestock Management. Credit 3. S**

A special three-week workshop course for teachers of vocational agriculture to be offered during the summer. This course includes problems in all phases of animal production selected by the group under the supervision of the instructor.

**605, 606. Advancements in Beef Cattle Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of beef cattle production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of beef cattle. Prerequisites: Animal Husbandry 406; Genetics 306; or approval of Head of Department.

**619, 620. Advancements in Sheep and Angora Goat Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of sheep and angora goat production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of sheep and angora goats. Prerequisites: Animal Husbandry 414; Genetics 306; or approval of Head of Department.

**621, 622. Advancements in Swine Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relating to the various phases of swine production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of hogs; fitting swine production to the whole farm enterprise; special problems relating to the planning and operation of swine production units. Prerequisites: Animal Husbandry 412; Genetics 306; or approval of Head of Department.

**631. Physiology of Reproduction. (2-0). Credit 2. II**

A critique of scientific literature concerning the processes of reproduction in farm mammals. Students will compile, evaluate, and summarize the literature on various phases of this subject. Consideration will be given to special problems on which further investigations are desirable and methods of outlining research projects for them. Prerequisite: Animal Husbandry 433.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the field of animal husbandry. Review of current literature and presentation of papers on selected animal husbandry topics. Prerequisites: Graduate classification; major in animal husbandry or genetics.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced studies in animal husbandry problems and procedures. Problems assigned according to the experience, interest, and needs of the individual student. Registration by approval of Head of Department. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the student's thesis or dissertation in the fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals, and physiology of reproduction. Prerequisite: Graduate classification.

## Division of Architecture

Professor T. R. Holleman,
Professors J. G. McGuire, M. M. Rotsch; Associate Professors E. J. Romieniec, Richard Vrooman; Assistant Professors C. J. Godwin, J. J. McGraw, J. H. Marsh, III, J. E. St. John, W. G. Wagner; Instructors J. V. Cudd, W. G. Horsley, D. J. Hutton; Lecturers Joseph Donaldson, Jr., J. W. Hall

**101. Design I. (0-6). Credit 2. I**

Analysis and application of the principles of design, with emphasis on the visual elements and the basic concept of their organization.

**102. Design I. (0-6). Credit 2. II**

Extension of Architecture 101. Further study and application of the principles of design, with emphasis on the proper use of materials in the basic order of space. Prerequisite: Architecture 101.

**115. Architectural Graphics. (1-3). Credit 2. I**

Drafting techniques; the principles of shades and shadows; perspective drawing.

**116. Architectural Graphics. (1-3). Credit 2. II**

Continuation of Architecture 115; perspective drawing; techniques of architectural delineation and graphic design. Prerequisite: Architecture 115.

**201. Design II. (0-12). Credit 4. I**

Extension of first-year design principles and graphics. Studies of structures and structural materials. Site and building relationships. Design of simple buildings. Color selection. Prerequisites: Architecture 102, 116.

**202. Design II. (0-12). Credit 4. II**

Continuation of Architecture 201. More thorough detailing of design solutions, especially in small buildings. Prerequisites: Architecture 201, 205.

**205. Graphic Art. (0-6). Credit 2. I**

Application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 102 for architectural students; equivalent experience preferred for others.

**206. Graphic Art. (0-6). Credit 2. II**

Continuation of Architecture 205. Further application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 205 or equivalent.

**227. Structural Principles. (3-0). Credit 3. I**

(For Option I Design students) Examination of structural systems and their structural, economic, and esthetic suitability as applied to architectural problems. Review of first year mathematics and an introduction to calculus as applied to structural design. Prerequisites: Mathematics 102, 116.

**228. Elements of Mechanics. (3-0). Credit 3. II, S**

Analysis of the external effects of a force system acting on a body at rest. Determination of section properties with emphasis leading to architectural structures. Prerequisite: Architecture 227 or Mathematics 223.

**253. Technology of Materials. (2-0). Credit 2. I**

A study of materials of construction, their properties, manufacture, characteristics, and uses. Prerequisite: Sophomore classification.

**254. Technology of Materials. (2-0). Credit 2. II**

Selection of materials, methods of construction. Prerequisite: Architecture 253.

**301. Design III. (0-15). Credit 5. I**

Intermediate design stressing complete solutions to individual problems. Emphasis on concept, methods, and materials of construction. Seminars dealing with architectural and related design fields. Prerequisite: Architecture 202.

**302. Design III. (0-15). Credit 5. II**

Further studies in intermediate design enlarging upon Architecture 301. Prerequisite: Architecture 301.

**305. Graphic Art. (0-6). Credit 2. I**

Continuation of Architecture 206. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 206 or equivalent.

**306. Graphic Art. (0-6). Credit 2. II**

Continuation of Architecture 305. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 305 or equivalent.

**325. Survey of Contemporary Art. (1-0). Credit 1. I**

A survey of the background and development of contemporary art, including the objectives, terminology, idioms, techniques and media of painting, sculpture and the graphic arts, with particular emphasis on their relation to architecture and the allied arts. Prerequisites: Junior classification for architecture students; sophomore classification for others.

**326. Survey of Contemporary Art. (1-0). Credit 1. II**

Extension of Architecture 325, with emphasis on relating contemporary art trends to cultural and technological developments. Prerequisite: Architecture 325 or equivalent.

**327. Basic Structures. (3-0). Credit 3. I**

Fundamentals of strength of materials, with emphasis on their application to architectural structures. Prerequisite: Architecture 228.

**328. Steel Structures. (2-2). Credit 3. II**

Application of the principles of statics and strength of materials to the design of architectural steel structures. Prerequisite: Architecture 327.

**331. Mechanics and Materials. (2-3). Credit 3. I, II**

A terminal course designed to acquaint the student with the general principles of mechanics and strength of materials and to give him some facility in their applications to simple framing systems. (For students in Industrial Education.) Prerequisites: Mechanical Engineering 101; Physics 201.

**335. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. I**

To acquaint and familiarize students with types, classes, functions, and limitations of mechanical and electrical equipment and their components. Various systems of plumbing, piping, heating, cooling, electrical distribution and wiring systems are studied in their relations to building construction. Prerequisites: Physics 202; junior classification.

**336. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. II**

A continuation of Architecture 335. Further study is made of the components of mechanical and electrical equipment as to their logical applications in completed systems of plumbing, space conditioning, and electrical wiring. Prerequisite: Architecture 335.

**339. Art and Civilization. (3-0). Credit 3. I**

Historical survey of the cultures of man with respect to art and architecture. Prerequisite: Junior classification.

**340. History of Architecture. (3-0). Credit 3. II**

Historical study of the development of architecture from the Pre-Classic through the Greek and Roman Classic, the Early Christian, Byzantine, Saracenic, and Romanesque periods. Prerequisites: Architecture 339 for students in architecture; junior classification for others.

**401. Design IV. (0-15). Credit 5. I**

Architectural and planning problems, with emphasis on analysis, research and design. Study of relationship of architecture, landscape architecture, city and regional planning, and other related design fields. Prerequisite: Architecture 302.

**402. Design IV. (0-15). Credit 5. II**

Continuation of Architecture 401, with architectural and planning problems of a more complex nature. Prerequisite: Architecture 401.

**427. Concrete Structures. (2-3). Credit 3. I, S**

Study of reinforced concrete for architectural structures; analysis and design; systems of forming. Prerequisite: Architecture 328.

**428. Roof Structures. (2-3). Credit 3. II, S**

The analysis and design of conventional roof system; roof trusses, beams and columns, and current roof deck systems. Prerequisite: Architecture 328.

**433. Architectural Environment. (3-0). Credit 3. I**

Study of environmental factors related to architectural design in terms of natural lighting, natural ventilation and sound. Prerequisites: Physics 202; junior classification.

**439. History of Architecture. (3-0). Credit 3. I**

Historical study of the development of architecture from the Gothic through the Renaissance and Post-Renaissance periods of Europe. Prerequisite: Architecture 340.

**440. History of Architecture. (3-0). Credit 3. II**

Historical study of American Period architecture, and the background, principles, philosophies, and significant figures of the Contemporary Movement in America and Europe. Prerequisite: Architecture 439.

**454. Specifications and Working Drawings. (1-6). Credit 3. I, II**

Detailed specifications; supervision and superintendence; building laws and codes; working drawings. Prerequisites: Architecture 202, 253, 254.

**500. Summer Practice. Twelve weeks; required; no credit. S**

Summer practice in architectural offices or with building contractors as the student may be registered in the Design Option or in the Construction Option. Required previous to registration for the fifth year.

**501. Design V. (0-15). Credit 5. I** †

Advanced architectural and planning problems, with emphasis on analysis, programming, research, site study, concept, consideration of related design fields, client contact and promotion. Prerequisite: Architecture 402.

**502. Design V. (0-15). Credit 5. II** †

Continuation of Architecture 501; problems of a more complex nature, with emphasis on awareness of office practice. Prerequisite: Architecture 501.

**527. Structural Systems. (2-3). Credit 3. I** †

Advanced studies in the systems of architectural structures. Prerequisites: Architecture 427, 428.

**528. Structural Systems. (2-3). Credit 3. II** †

Study of structural problems as related to actual professional practice; special consideration of design factors, new materials, codes, economy, specification surveys of costs. Prerequisite: Architecture 527.

**554. Professional Practice. (2-0). Credit 2. I, II** †

To familiarize the student with the usual problems of office practice, professional relations, ethics, building law and contracts. Prerequisite: Senior classification.

**556. City Planning. (2-3). Credit 3. I** †

Survey of planning principles and procedures; legal aspects; physical and social development of the city; housing. Prerequisite: Senior classification.

**581. Seminar. (1-0). Credit 1. II**

Seminars presented orally by students, faculty, and professional people, with subjects relating to architecture and the construction of buildings. Prerequisite: Fifth year classification.

### FOR GRADUATES

**627. Contemporary and Creative Structures. (2-2). Credit 3. I**

Studies and analyses of contemporary and creative structures as related to architectural design, with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 528 or the equivalent.

**628. Contemporary and Creative Structures. (2-2). Credit 3. II**

Continuation of Architecture 627. Studies and analyses of contemporary and creative structures as related to architectural design with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 627.

**629, 630. History and Archaeology. (2-0). Credit 2 each semester. I, II**

Individual problems of study and research in the field of American architecture and archaeology.

**681. Seminar. (1-0). Credit 1 each semester. I, II, S**

Review of current work in architecture; original presentations on selected topics.

**685. Problems. Credit 1 to 4. I, II, S**

Individual problems involving the application of theory and practice in the design and construction of buildings and groups of buildings.

**691. Research. Credit 2 to 4 each semester. I, II, S**

Research for thesis.

## Basic Division

Associate Director C. H. Ransdell; Professors W. J. Dobson, D. F. Parry;
Associate Professor S. A. Kerley; Assistant Professors U. W. Crow,
A. E. Denton, Jr., W. D. Kutach; Instructor R. L. Provost

**101. Orientation. (0-2). Credit 1. I, II**

Designed to assist the student in (1) the process of making adequate personal and social adjustment to college life; (2) the recognition and development of his aptitudes, interests, and abilities, and the selection of attainable life goals; and (3) becoming acquainted with the scope of the curricula and vocational opportunities in the fields of specialization offered by the College.

**102. Remedial Reading. (0-3). Credit 1. I, II, S**

A laboratory course designed to remedy a student's reading disability and to increase his reading rate and comprehension. In addition to the regular two one-hour meetings per week, two thirty-minute practice periods are required.

**103. College Study. (0-2). Credit 1. I, II**

A laboratory course designed to familiarize the student with the principles of learning and to relate them to the study of specific school subjects.

**104. Individual Adjustment. (0-2). Credit 1. I, II**

A course designed to help the student understand himself and the nature of the society of which he is a member.

**105. The World of Work. (0-2). Credit 1. I, II**

A course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas will be studied intensively, and each student will be given an opportunity for studying his aptitudes and interests and relating them to various vocational requirements.

**106. Survey of Man's Knowledge. (0-2). Credit 1. II**

A survey course designed to acquaint the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature will be investigated.

**107. The Engineering Profession. (0-2). Credit 1. II**

Extensive information about the broad general profession of engineering and intensive information about the specific branches of engineering.

## Department of Biochemistry and Nutrition

Professor C. M. Lyman,
Professors J. R. Couch, H. O. Kunkel, J. L. Liverman*, J. M. Prescott, Raymond Reiser, L. R. Richardson; Assistant Professors B. J. Camp, J. G. Davis**

**312. Veterinary Physiological Chemistry. (3-6). Credit 5. I**

A study of the chemical nature of physiological processes, including the synthesis and breakdown of body tissues and the chemical changes undergone by metabolites from ingestion to excretion. Variations among domestic animals in normal and abnormal conditions will be considered. Prerequisite: Chemistry 228.

**401. Human Nutrition. (3-0). Credit 3. I** †

A study of the functions of food constituents in health and in physiological stress. The economic, national, and international aspects of human nutrition. Prerequisite: Junior classification.

**410. Introductory Biochemistry. (3-3). Credit 4. I** †

The chemistry of the major constituents of living organisms. Biophysical and biochemical processes in plants and animals are stressed. The laboratory work includes the application of quantitative analytical procedures to plant and animal tissues and fluids. Prerequisites: Chemistry 223 and 231 or 228.

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*On leave of absence.
**Resigned effective December 6, 1959.

**430. Electron Microscopy. (2-3). Credit 3. II** †

Descriptive treatment of various aspects of electron microscopy and laboratory practice employing selected specimens. Elementary discussion of electron optics, design of electron microscopes, photographic plates, underfocusing, overfocusing, asymmetry, colloidal state, shadow casting. Biological and physical science applications in all technical departmental fields of the College given equal attention. Prerequisite: Senior or graduate classification in a physical or biological science, or approval of the instructor.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit laboratory investigations or the study of subject matter not included in established courses. Prerequisite: Approval of Head of the Department.

**Animal Husbandry 444. Large Animal Nutrition. (3-0). Credit 3. II** †

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 411. Poultry Feeding. (3-2). Credit 4. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**601. Biochemistry of Plants. (3-0). Credit 3. I**

A study of the major groups of organic compounds occurring in plants with emphasis on their biological synthesis, physiological function, and changes in chemical structure due to metabolic processes. Prerequisite: Biochemistry and Nutrition 410 or 611. (Offered in 1959-60 and in alternate years thereafter)

**611. General Biochemistry. (3-0). Credit 3. I**

A consideration of the chemical constituents and reactions of living cells. Particular emphasis is given to the metabolism and nutritional significance of proteins, carbohydrates, and lipids. Prerequisites: Chemistry 207 or 316, 228.

**612. Laboratory Procedures in Biochemistry. (0-6). Credit 2. I**

A laboratory course designed to familiarize the student with the application of chemical and biological methods to the solution of fundamental biochemical problems. Prerequisite: Biochemistry and Nutrition 611 or registration therein.

**613. Vitamins. (3-0). Credit 3. II**

The role of vitamins in animal nutrition and their occurrence in plant and animal tissues. Prerequisite: Chemistry 228.

**614. The Determination of Vitamins and Minerals. (0-3). Credit 1. II**

A laboratory course designed to familiarize the student with methods for the determination of vitamins and minerals in biological materials. Prerequisite: Biochemistry and Nutrition 613 or registration therein.

**615. Experimental Animal Procedures. (0-3). Credit 1. II**

A laboratory course involving the management, preparation of purified rations, and the production and cure of nutritional diseases. Prerequisites: Biochemistry and Nutrition 613, 614 or registration therein.

**618. Chemistry and Metabolism of Lipids. (2-0). Credit 2. II**

An advanced course in lipid chemistry and metabolism. Prerequisite: Biochemistry and Nutrition 611.

**619. Proteins. (2-0). Credit 2. I**

Advanced studies on the chemical, physical, and biological properties of proteins. Particular emphasis will be placed on the biological synthesis and metabolism of proteins. Prerequisite: Biochemistry and Nutrition 611.

**620. Advanced Biochemical Techniques. (0-6). Credit 2. S**

A laboratory course involving practice in the use of special techniques and instruments employed in biochemical research and the isolation, identification, and analysis of biological compounds. Preparation of representative enzymes and laboratory work on factors affecting their action. Prerequisites: Biochemistry and Nutrition 612, 624.

**624. Enzymes. (2-0). Credit 2. II**

General principles of enzyme chemistry. The physical chemistry of enzyme action. Types of enzymes and coenzymes. Enzymes in the patterns of metabolism. Prerequisites: Biochemistry and Nutrition 601 or 611; Chemistry 324 or 342; or approval of instructor.

**626. Radioisotopes Techniques. (2-3). Credit 3. I**

A general course on the nature and utilization of isotopes in chemical and biochemical studies. History, general properties of nuclei, nuclear reactions, radiations; health physics and instrumentation will be included. Prerequisites: Chemistry 316, 317; Physics 201, 202.

**627. Mineral Nutrition and Metabolism. (2-0). Credit 2. II**

A study of the role of minerals in animal nutrition with emphasis on physiological function, biochemical interrelationships with other minerals and other nutrients, deficiency symptoms and nutritional significance. Prerequisite: Biochemistry and Nutrition 410 or 611.

**628. Biochemical Preparations. (0-6). Credit 2. S**

A laboratory course dealing with the isolation and synthesis of organic compounds which are important in biological systems. Particular emphasis is placed on recent techniques of isolation. Prerequisite: Biochemistry and Nutrition 612.

**630. Metabolism. (3-0). Credit 3. I**

A descriptive consideration of the various chemical pathways of metabolism. Prerequisites: Biochemistry and Nutrition 611, 613.

**632. Radioactive Tracer Techniques in Metabolism. (1-3) or (1-6). Credit 2 or 3. II**

The use of isotopes in measuring the metabolic pool, precursor-product relationships, isotopic competition, cycles and intermediates, isotopic dilution and double dilution, permeability, adsorption and absorption and assay of common elements. Prerequisites: Biochemistry and Nutrition 611, 612, 626, or approval of instructor.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

The study and discussion of original articles in biochemistry and nutrition and related fields designed to broaden the understanding of problems in the field and to stimulate research.

**685. Problems. Credit 1 or more each semester. I, II**

An advanced course in biochemical laboratory procedures including preparations and instrumentation. Problems assigned according to the experience, interests, and needs of the individual student.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Laboratory facilities are available for original investigations in various phases of biochemistry and nutrition. Prerequisite: Approval of major advisor.

**Genetics 631. Biochemical Genetics. (2-0). Credit 2. I**

See Department of Genetics for a full description of this course.

## Department of Biology

Professor C. C. Doak,
Professors S. O. Brown, W. J. Dobson, H. L. Gravett, S. H. Hopkins, Charles LaMotte, G. E. Potter, J. J. Sperry; Associate Professors L. S. Dillon, E. H. Gibbons, G. M. Krise, A. B. Medlen, H. D. Thiers; Assistant Professors W. J. Clark, F. H. Kasten, C. E. Miller, N. P. Wood; Instructor W. G. Degenhardt

Courses in the biological sciences administered by the Department of Biology include sequential programs in botany, microbiology, and zoology. All courses, irrespective of subject matter area, bear the departmental designation, (Biology) and a course number from a single numerical sequence. The nature of the offerings is more clearly indicated, however, by the subject matter grouping shown on the following pages.

### GENERAL BIOLOGY

**115. Survey of Biology. (3-3). Credit 4. I, II**

A summarization of biological forms and principles and their impact upon man and his affairs.

**225. Personal and Public Health. (2-0). Credit 2. I**

A general introduction to personal and community health. Designed primarily to enable the individual to utilize available knowledge and facilities to raise the health standard of his home and community.

**330. Life Science. (2-0). Credit 2. II**

Readings of grouped essays covering fifteen of the major subdivisions of life science together with integrating lectures designed to fit each into its place in life and industry. Prerequisite: Junior classification. (Not open to those with more than 7 hours of credit in biology.)

**337. Organic Evolution. (2-0). Credit 2. I**

A study of the evidences of the evolution of plants, animals, and man. Phylogeny and interrelationships of living things, the main lines of evolution, variation and the origin of species will be studied; man and the future considered. Prerequisite: Three hours of biology or approval of instructor.

**481. Seminar in Biology. (1-0). Credit 1. I** †

Recent advances. For graduates and advanced undergraduate majors in either microbiology, botany, or zoology. May be repeated once for credit not to exceed two hours.

**482. Seminar in Biology. (1-0). Credit 1. II** †

Integration of the branches of biological science. May be repeated once for credit not to exceed two hours.

**485. Biological Problems. Credit 1 to 4. I, II**

Problems in the various phases of plant, animal, and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

### FOR GRADUATES

**600. Teaching of High School Biology. (2-3). Credit 3. S**

A study of the problems and techniques of teaching biology in the secondary school, along with appropriate subject matter. The laboratory work emphasizes those exercises, projects, and materials which are most useful in the high school biology laboratory and in stimulating interest in the subject. Prerequisite: Approval of the Heads of the Biology and Education and Psychology Departments.

**654. Radiation Biology. (3-0). Credit 3. II**

Lecture and demonstration reviewing the physical theory of radiations important to living organisms with especial emphasis on ionizing radiation; X-ray, gamma, alpha, beta and neutron. Survey of the effects of ionizing radiations on biological systems. Prerequisite: Graduate classification in biological or agricultural science.

**681. Seminar. (1-0). Credit 1. I, II**

Detailed reports on specific topics in the field chosen. Prerequisite: Graduate classification in the appropriate field.

**685. Problems. Credit 1 to 4 each semester. I, II**

Limited investigations in fields other than those chosen for thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Prerequisite: Approval of ranking professor in the field chosen.

## BOTANY

**101. General Botany of Seed Plants. (2-3). Credit 3. I, II**

The seed plant as a living unit; external and internal structures in relation to life processes; reproduction and life history.

**102. Taxonomy of Flowering Plants. (2-3). Credit 3. II**

Designed to give training in the use of keys and in the identification of flowering plants, family characteristics and relationships, and other applied phases of plant science. Prerequisite: Biology 101.

**327. Fundamental Plant Morphology. (2-3). Credit 3. I**

Structural, reproductive, and taxonomic features of representatives of the major plant groups, with particular attention to groups not covered in Biology 101. Prerequisite: Biology 101.

**349. Field Taxonomy. (2-3). Credit 3. S**

Study and identification of the flora of selected areas, technique of collection and preparation of plant specimens. Studies in plant distribution and relationships. Prerequisite: Biology 102.

**353. Mycology. (2-3). Credit 3. I** †

An introduction to the study of fungi, including structure, reproduction, ecological relationships, and taxonomic aspects. Emphasis on forms of special significance to commercial processes, plant diseases, antibiosis, and fermentation. Prerequisites: Biology 101, 206, or approval of instructor. (Offered in 1959-60 and in alternate years thereafter.)

**453. Plant Anatomy. (2-3). Credit 3. I** †

Fundamental anatomy of the vegetative and reproductive organs of the plant with emphasis on development of tissue types. Technique of staining and mounting of plant tissues. Prerequisite: Six hours of plant sciences including Biology 101 or the equivalent.

### FOR GRADUATES

**608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

A study of the form, structure, reproduction, and ecology of the algae, with detailed work on selected locally available forms, both marine and fresh water. Prerequisite: Biology 327 or 353 or approval of the instructor. (To be offered in 1960-61 and in alternate years thereafter.)

**615. Cytology. (2-6). Credit 4. I**

An intensive study of the organization and activities of the cell, with emphasis on topics related to cytogenetics and cytotaxonomy. Prerequisites: Genetics 301; approval of the instructor.

**619. Systematic Botany. (2-6). Credit 4. I, II**

Principles of taxonomy. Phylogenetic considerations and criteria used in schemes of classification. History of classification. Nomenclature and identification. Field and herbarium techniques. Prerequisites: Biology 102, 327, or approval of the instructor.

**620. Systematic Botany. (2-6). Credit 4. I, II**

Survey of Angiosperms with emphasis on relationships. Biosystematics and modern taxonomy. Procedures in monograph preparation. Monographers. Field and herbarium techniques with problems designed for individual needs and interests. Prerequisite: Biology 619. (Offered in 1959-60 and in alternate years thereafter.)

**623. Plant Morphology. (2-6). Credit 4. II**

A study of the anatomical, reproductive, and organogenetic features of representative vascular plants; emphasis on economic forms. Prerequisite: Biology 327 or the equivalent.

**651. Mycology. (2-6). Credit 4. II**

Detailed studies of the fungi, with emphasis on life cycles of representative forms; genetics and cytology; principles of taxonomy; ecology and geographical distribution. Actinomycetes and lichens are also considered. Prerequisite: Biology 353 or approval of the instructor. (Offered in 1959-60 and in alternate years thereafter.)

## MICROBIOLOGY

A major in microbiology offers thorough and comprehensive training in the biology of bacteria and certain of the algae, fungi, and protozoa that supplement the study of the microorganisms in their relation to medicine, industry, and agriculture. The curriculum is intended to equip the student with sound training in the principles of microbial life, as either preparation for graduate study or for a career in either industrial or civil service.

**206. Introductory Microbiology. (2-4). Credit 3. I, II**

Relation of microorganisms to agriculture, industry, and health of man, animals, and plants. Prerequisites: Chemistry 102; 3 hours of biology.

**438. Bacterial Physiology. (2-6). Credit 4. I**

A detailed study of the physiological activities of bacteria. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1960-61 and in alternate years thereafter.)

**457. Bacterial Ecology. (2-6). Credit 4. II** †

Relation of bacteria to their environment, especially to other microorganisms. Methods of isolation, identification, and differentiation. Prerequisite: Biology 206. (Offered in 1960-61 and in alternate years therafter.)

**Biology 353. Mycology. (2-3). Credit 3. I** †

See page 242 for a full description of this course.

**Dairy Science 320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

See Department of Dairy Science for a full description of this course.

**Dairy Science 326. Food Preservation and Decomposition. (3-3). Credit 4. II** †

See Department of Dairy Science for a full description of this course.

**Veterinary Microbiology 435. Microbiology and Immunology. (3-4). Credit 4. I †**

See Department of Veterinary Microbiology for a full description of this course.

**Veterinary Microbiology 436. Pathogenic Microbiology. (3-3). Credit 4. II †**

See Department of Veterinary Microbiology for a full description of this course.

## FOR GRADUATES

**635. Physiology of Microorganisms. (2-6). Credit 4. I**

An advanced consideration of the physiological activities of bacteria with special emphasis on metabolism. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1960-61 and in alternate years thereafter.)

**647. Industrial Microbiology. (2-6). Credit 4. II**

Microorganism as the basis of industrial processes. Practice includes antibiotic assay; analysis of products of metabolism, and fermentation balances. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1959-60 and in alternate years thereafter.)

**Biology 630. Protozoology. (3-3). Credit 4. II**

See page 246 for a full description of this course.

**Biology 651. Mycology. (2-6). Credit 4. II**

See page 243 for a full description of this course.

**Plant Physiology and Pathology 607. Physiology of the Fungi. (3-0). Credit 3. II**

See Department of Plant Physiology and Pathology for a full description of this course.

**Plant Physiology and Pathology 618. Bacterial Plant Diseases. (2-3). Credit 3. II**

See Department of Plant Physiology and Pathology for a full description of this course.

**Plant Physiology and Pathology 620. Plant Viruses. (2-0). Credit 2. I**

See Department of Plant Physiology and Pathology for a full description of this course.

## ZOOLOGY

**107. Vertebrate Zoology. (2-3). Credit 3. I, II**

Structure, physiology, and development of animals; emphasis on the biology of vertebrates.

**108. Invertebrate Zoology. (2-3). Credit 3. I, II**

Classification, comparison, anatomy, and physiology of invertebrate animals. Specimens from the more important invertebrate phyla are studied in the laboratory. Prerequisite: Biology 107 or approval of instructor.

**217. Comparative Anatomy of Vertebrates. (2-4). Credit 3. I**

Comparative anatomy of the Prochordates and the lower vertebrates through Reptilia. Laboratory animals: Molgula, Dolichoglossus, Amphioxus, Squalus, Necturus, and Phrynosoma. Prerequisites: Biology 107, 108.

**218. Comparative Anatomy of Vertebrates. (2-4). Credit 3. II**

Comparative anatomy of birds and the mammals. Laboratory animals: the chicken and the cat. Prerequisite: Biology 217.

**219. Mammalian Anatomy. (2-3). Credit 3. I**

Principles of normal anatomy of cat and man. Nature and causes of mechanical injuries of man. Prerequisite: Biology 107.

**220. Physiology and Hygiene. (2-3). Credit 3. II**

A continuation of Biology 219. Normal and abnormal physiology of man. Prerequisite: Biology 219.

**325. Physical Anthropology. (3-0). Credit 3. II**

Man's relation to and position in the animal kingdom. Physical characteristics of mankind. Fossil and living types. Races and racial characteristics. Somatotypes. Prerequisite: Three hours of biological science.

**335. Gross and Microscopic Vertebrate Anatomy. (2-3). Credit 3. I**

Study of selected features of anatomy, embryology, and histology with emphasis on higher vertebrates. Although the cat is used as the laboratory animal, another vertebrate may be chosen if warranted and approved by the instructor. Prerequisite: Biology 107 or the equivalent.

**343. Histology. (2-3). Credit 3. I** †

Normal tissues of vertebrates including histogenesis of some. Histogenesis and organography of mammalian tissues reviewed. Prerequisite: Biology 217 or 335.

**344. Embryology. (2-3). Credit 3. II** †

Introduction to general and comparative vertebrate embryology; emphasis on early development of frog, chick, and pig. Prerequisite: Biology 217 or 335.

**422. Microtechnique. (1-6). Credit 3. II** †

Standard methods in the preparation of permanent microscopic slides of plant and animal tissues. Prerequisite: Twelve hours of biological science.

**433. General Physiology. (3-3). Credit 4. I** †

Fundamental physiology of protoplasm; basic processes and functions of organs and systems. Emphasis is placed on digestion, respiration, metabolism, excretion, muscular contraction, and reproduction. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

**434. Circulatory and Nerve Physiology. (2-3). Credit 3. II** †

Comparative functions of the circulatory, nervous system, and of the organs of special sense. Prerequisites: Biology 218; or Biology 107 and senior or graduate classification in an animal science.

**435. Advanced Invertebrate Zoology. (3-3). Credit 4. I** †

Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisite: Biology 107 or 108.

**436. Animal Parasitology. (3-3). Credit 4. II** †

Study of parasitic worms and protozoa; laboratory methods in parasitology. Prerequisite: Biology 435 or equivalent.

## FOR GRADUATES

**603. Advanced Vertebrate Zoology. (1-5). Credit 3. II**

Phylogeny of vertebrates based on comparative anatomy, histology, embryology, and distribution. Prerequisites: Biology 218, 343, 344, or the equivalent.

**604. Advanced Embryology. (1-5). Credit 3. I**

Comparative and experimental studies of the mechanics of embryonic development. Prerequisites: Biology 218, 343, 344, or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**627. Helminthology. (3-3). Credit 4. I**

A study of the parasitic worms, especially Trematoda, Cestoda, Nematoda, and Acanthocephala. Prerequisite: Biology 436. (Offered in 1960-61 and in alternate years thereafter.)

**630. Protozoology. (3-3). Credit 4. II**

Morphology, taxonomy, physiology, reproduction, phylogeny, ecology, and life history of both free living and parasitic protozoa. May be taken concurrently with parasitology. Prerequisite: Biology 108. (Offered in 1959-60 and in alternate years thereafter.)

**632. Methods in General Physiology. (2-6). Credit 4. II**

Methods for the quantitative study of metabolism, respiration, circulation, excretion, movement, and other basic physiological phenomena. Recent advances in physiological methods to be presented on a seminar basis. Prerequisite: Biology 433 or the equivalent.

**649. Biology of the Endocrine Glands. (3-3). Credit 4. I**

A study of the structure, development, comparative anatomy, and physiology of the endocrine glands of the different animal groups. Prerequisites: Three hours of either anatomy or anatomy and physiology.

**653. Zoogeography. (3-0). Credit 3. II**

A study of the distribution of animals during geologic and present times; emphasis on the role of ecology and the effects of geography upon terrestrial and marine distribution. Prerequisite: Twelve hours of biological sciences, including at least 3 hours of advanced courses.

**656. Analytical Histology. (2-6). Credit 4. II**

Designed to acquaint the student with certain quantitative histochemical techniques in plant and animal science as applied to nucleoproteins, carbohydrates, lipids, and enzymes. Presentation of cytological evidences which aid in localizing the activities of nucleoproteins in cell metabolism. Prerequisites: Biology 343 or 453 or the equivalent; Chemistry 227.

## Division of Business Administration

Professor T. W. Leland,
Professors D. R. Fitch, P. B. Goode, T. R. Hamilton, S. C. Hoyle, Jr., R. M. Stevenson, T. R. Yantis; Associate Professors R. L. Elkins, H. G. Kenagy, T. D. Letbetter, W. S. Manning, E. S. Packenham, J. E. Roche, N. A. Stewart, Jr., H. G. Thompson, Jr., William Whittington, R. P. Wood; Assistant Professors J. H. Dozier, J. E. Oliver, E. F. Sauer, L. H. Taylor, Jr.; Instructors J. D. Ingram, T. O. Kirkpatrick, D. C. Lowe, H. F. Lyles, J. L. Sandstedt, W. L. Thornton

**105. Introduction to Business. (3-0). Credit 3. I, II**

Provides an over-all picture of business operations, develops a business vocabulary, and directs the thinking of each student to the field of business best suited to his interest and talent. Subject matter includes an analysis of the specialized fields within the business organization and of the role of business in modern society.

**205. Marketing. (3-0). Credit 3. I, II, S**

A study of institutions, processes, and problems involved in transferring goods from producers to consumers, with emphasis on economic and social aspects.

**206. Purchasing and Control of Materials. (2-0). Credit 2. I, II, S**

Operation of a purchasing department in a manufacturing business; organization of the department; specifications, standards, contract provisions; sources of supply; methods of perpetual inventory.

**208. Advertising. (3-0). Credit 3. I, II**

Place of advertising in business; advertising media, such as the newspaper, tradepaper, magazine, direct mail, poster, and the radio; description of the various methods of advertising; development of copy and layout of advertisements; consumer habits and psychology; methods of investigations for advertising campaigns; cost of advertising; legal and ethical problems involved in advertising; consideration of advertising from the standpoint of consumers. Prerequisites: Business Administration 205; Economics 203.

**216. Building Products. (0-2). Credit 1. II**

A study of building products, their physical properties, and their markets. Prerequisite: Business Administration 205.

**227. Principles of Accounting. (3-3). Credit 4. I, II, S**

An introductory course designed to serve as a foundation for study of advanced accounting and to furnish a knowledge of accounting which will be of value to students in other fields. The subject matter includes: analysis and recording of business transactions; use of journal and ledger; trial balance and work sheet; adjusting and closing entries; accounting statements; payroll records and payroll taxes; introduction to partnership accounting; special journals and ledgers; business papers and business procedures related to accounting; voucher system.

**228. Principles of Accounting. (3-3). Credit 4. I, II, S**

A continuation of Business Administration 227. Internal control; partnership and corporation accounting; accounting for manufacturing concerns; analysis and interpretation of statements. Prerequisite: Business Administration 227.

**303. Statistical Method. (3-3). Credit 4. I, II, S** †

Collection, tabulation, presentation, and analysis of data. A study of sampling, graphics, averages, ratios and coefficients, dispersion, skewness, probability and error, index numbers, seasonal and long-time trend, barometers, correlation. Prerequisite: Mathematics 101.

**304. Business Cycles and Business Measurements. (3-0). Credit 3. I, II, S** †

An empirical and statistical study of economic fluctuations; theory, causes, and control of business cycles; business barometers and forecasting. Study of economic and statistical services. Prerequisite: Business Administration 303.

**305. Business Law. (3-0). Credit 3. I, II, S** †

Nature and scope of law; court system; homestead and exemption laws of Texas; law of contracts; principal and agent; business organizations, including partnerships and corporations; the Texas community property laws. Prerequisite: Sophomore classification.

**306. Business Law. (3-0). Credit 3. I, II, S** †

Additional studies in the law of business, dealing with bailments, carriers, mortgages, suretyships, negotiable instruments, banks and banking, wills and estates, sales, bankruptcy. Prerequisite: Business Administration 305.

**308. Law of Private Corporations. (3-0). Credit 3. I, II** †

Powers and limitations of the corporate form of business organization as distinguished from other forms of business enterprise. Legal problems encountered in formation, management, financing, and dissolution of corporations. Rights of corporate stockholders and creditors. Legislative control under state and federal statutes. Prerequisite: Business Administration 306.

**310. Credits and Collections. (2-0). Credit 2. II**

The elements of mercantile and consumer credit; organization of a credit department; sources of credit information; collection tools and procedures.

**312. Statistical Charts and Graphs. (2-0). Credit 2. II**

Graphic presentation of statistical data, construction of charts, calculating charts and nomographs, statistical maps, rate of change analysis, visual aids in presenting business reports. Prerequisite: Business Administration 303. (Offered in 1960-61 and in alternate years thereafter.)

**315. Insurance. (3-0). Credit 3. I, II, S**

A general introductory course dealing with the theory and practice of insurance and its economic and social significance. A critical examination is made of the various types of life, fire, and automobile contracts available for protection against personal and business risks. In addition a brief study is made of state and federal insurance plans, suretyship, and other casualty and property coverages. Prerequisite: Sophomore classification.

**316. Office Management. (2-0). Credit 2. I, II, S**

The problem of office management; the function of the office manager; office systems, handling of correspondence, filing, mailing; office furniture and equipment; office forms and supplies and their control; the office building and the office layout; selection, training, and compensation of office personnel; office manuals and reports; budgetary control in the office.

**317. Punch Card Methods. (1-2). Credit 2. I, II, S**

Instruction and practice in the operation of punch card machines for the handling of accounting and statistical data. Prerequisites: Business Administration 228, 303.

**318. Wholesale Merchandising. (3-0). Credit 3. I, II**

A presentation of the basic principles and economic functions of the wholesaler. Also a study of the modern wholesaling systems and the operation and management of a wholesale business. Prerequisites: Business Administration 205; junior classification.

**320. Life Insurance. (3-0). Credit 3. I** †

This basic life insurance course presents the fundamentals of life insurance and annuities for the future life underwriter. The economic background of life insurance, and the various life insurance and annuity contracts are discussed relative to their utilization in private life and business. Included are fundamentals of rate-making, reserves, cash surrender values, dividends, and the selection of risks. Prerequisite: Business Administration 315.

**322. Property Insurance. (3-0). Credit 3. I** †

A study of the principles and practices of property insurance designed for those who enter either the property and casualty insurance or property management fields. The course includes fire and allied lines contracts, consequential losses, protection of the mortgagee, transportation insurance (both ocean and inland), multiple line contracts, and rate-making. Prerequisite: Business Administration 315.

**324. Casualty Insurance and Suretyship. (3-0). Credit 3. II** †

This course places emphasis upon the principles of casualty insurance and surety bonding. Employer's liability insurance is studied in conjunction with workmen's compensation insurance. The liability risks of business, professional, and personal activities are discussed. Theft, disability, aviation, glass, power plant, and credit insurance are discussed. Prerequisite: Business Administration 315.

**325. Retailing. (3-0). Credit 3. I, II, S**

Fundamental operations of retailing concerns and the need for effective coordination of retailing activities. Prerequisites: Business Administration 205; Economics 203, 204.

**327. Intermediate Accounting. (2-3). Credit 3. I, S**

Working papers and preparation of statements; correction of books and statements; special phases of corporation accounting; cash and receivables; inventories, investments. Prerequisite: Business Administration 228.

**328. Intermediate Accounting. (2-3). Credit 3. II, S**

Investments; tangible and intangible fixed assets; liabilities; reserves; statement analysis; statement of application of funds; cash-flow statement; statements from incomplete records; quasi-reorganizations, business combinations, divisive reorganizations; income tax allocation; price-level impact on financial statements. Prerequisite: Business Administration 327.

**329. Elementary Cost Accounting. (3-0). Credit 3. I, II, S**

Development of cost accounting principles relating to material, labor, and manufacturing expenses; basic cost accounting practices and procedures, with special emphasis on job order costing; survey of principles and practices of process cost accounting. Prerequisite: Business Administration 228.

**330. Advanced Accounting. (3-0). Credit 3. I, S** †

Special phases of partnership accounting; joint ventures; consignments; installment sales, accounting for insurance costs; statement of affairs and accounting for insolvent concerns; compound interest; home office and branch accounting. Prerequisite: Business Administration 328 or registration therein.

**332. Cost Accounting. (3-0). Credit 3. II, S**

Advanced process cost procedures, costing of joint and by-products, estimated costs, standard costs, managerial reports and analysis for cost control, direct costing, break-even analysis. Prerequisite: Business Administration 329.

**333. Business Machines. (0-2). Credit 1. I, II**

A study of major types of machines used for assembling and recording accounting and statistical information. Prerequisite: Business Administration 228.

**337. Data Processing. (2-2). Credit 3. I, II**

Use of electronic computers for recording and reporting, sorting; searching; collating; file maintenance; integrated data processing; coding of information; tables and approximations; storage of information; practical application. Prerequisite: Junior classification.

**344. Marketing Problems. (3-0). Credit 3. II** †

A study of the problems involved in the marketing of industrial and consumer goods; the problems connected with customer relations, channels of distribution, brands, sales promotion, pricing, and legislation. Prerequisite: Business Administration 325.

**352. Personal Finance. (2-0). Credit 2. I, II**

Personal and family accounts; budgets, budgetary control; bank accounts; charge accounts; borrowing; investing; insurance; standards of living; renting; home ownership; wills, trust plans. Not open to business administration students for credit.

**402. Accounting Systems. (2-0). Credit 2. II** †

Survey of accounting systems in current use by different types of businesses. System design and installation. Manual and machine procedures. Prerequisite: Business Administration 328.

**403. Income Tax. (3-0). Credit 3. I, II** †

Income tax legislation; the present income tax law and regulations; treasury decisions, court decisions, and departmental rulings; income tax problems and returns. Prerequisite: Business Administration 327.

**406. Managerial Accounting. (3-0). Credit 3. II** †

A study of the uses of accounting information by management. Emphasis is placed on accounting procedures and reports essential to management. Cost analysis, cost control, budgeting and controllership. Prerequisite: Business Administration 329.

**407. Auditing. (3-0). Credit 3. I** †

Auditing procedures used by internal auditors and independent public accountants; preparation of working papers. Prerequisites: Business Administration 328, 329.

**408. Auditing. (3-0). Credit 3. II** †

A continuation of Business Administration 407. Work on an audit practice case with preparation of working papers and audit report, case studies involving auditing problems in special situations. (Required of students who plan to enter public accounting.) Prerequisite: Business Administration 407.

**409. Survey of Accounting Principles. (3-0). Credit 3. I, II, S** †

A survey of accounting designed for students majoring in engineering and architecture. The course provides for a survey of accounting procedures, basic elements of cost accounting, and the preparation and interpretation of financial statements. The course is not as comprehensive as Business Administration 227, 228, is not open to students in business administration, agricultural administration, or liberal arts. Prerequisite: Junior classification.

**416. Oil Production Accounting. (3-0). Credit 3. II**

A study of the systems and procedures for the acquisition of undeveloped oil properties, development of oil properties, and production of crude oil. Emphasis is placed upon the work in the accounting department of a crude oil producing company and the accounting treatment of intangible development costs, depletion allowance, and oil pipe line operations. Prerequisites: Business Administration 227, 228.

**418. Corporation Finance. (3-0). Credit 3. I, II, S** †

Common forms of business organization with special attention to the corporation; advantages and disadvantages of incorporation; capital stock and bonds; working capital; surplus and dividend policy; corporate expansion and industrial combination; failure and reorganization. Prerequisite: Economics 203 or the equivalent.

**420. Principles of Investment. (3-0). Credit 3. I, II, S** †

The development of investment policy; the character of investment risk; a comparison of investment media; a description of security markets and their operations. Prerequisite: Business Administration 418.

**422. Personnel Problems of Industry. (3-0). Credit 3. I, II, S** †

The relation of the worker to his employer, the methods of job finding, interviewing aids, occupational trends, scientific management, the functions and structure of personnel departments, employee welfare activities, and other problems of contemporary industrial development. Prerequisite: Junior classification.

**423. Personnel Policies and Techniques. (3-0). Credit 3. I, S** †

Programs and agencies which workers and employers have developed to improve their economic and social status; job analysis, description, and classification; wage and salary problems and procedures; personnel records. Prerequisite: Business Administration 422.

**427. Insurance Law. (3-0). Credit 3. II** †

Law cases on insurance to develop an understanding of the methods of administrative control by the state; typical clauses of insurance policies and their interpretation by the courts; technical legal pitfalls; case examples from all forms of insurance coverage; Texas insurance law. Prerequisite: Business Administration 305.

**428. Real Estate Titles and Conveyances. (3-0). Credit 3. I, II, S** †

The ownership and transfer of titles to real property, including deeds, easements, urban and rural property with special attention to zoning, building codes, private restrictions and conditions. The law of fixtures, timber and crops, mortgages and liens, building contracts, plans and specifications, performance bonds, mines and minerals, contracts of sale, escrow and earnest money agreements, real estate brokers, sufficiency of property description, and other matters related to real property. Prerequisite: Business Administration 305.

**430. Cost Accounting Survey. (3-0). Credit 3. I, II, S** †

An introductory cost accounting course following Business Administration 409, for architects, engineers, and agricultural students. Purposes and uses of cost accounting; elements of cost; unit costs for use in bidding on contracts; comparison of cost procedures; job order and process costs, budgets, and standard costs; cost reports. Prerequisite: Business Administration 409.

**432. Security Analysis. (3-0). Credit 3. II** †

Methods of analyzing individual security issues, establishment of principles of selection and protection of security holdings, setting up sound and workable tests of safe investments including financial statement analysis, understanding rights and interests of investors in senior securities and owners of common stock. Prerequisite: Business Administration 420.

**433. Business Management. (3-0). Credit 3. I, II, S**

The course deals with fundamental concepts and principles of business organization and management. The functions of planning, organizing, motivating, and controlling are examined relative to their application to firms of varying size and nature. Problems inherent in organizational relationships are appraised and possible solutions are developed and discussed. Prerequisite: Junior classification.

**434. Problems in Finance. (3-0). Credit 3. II** †

The course presents a series of comprehensive financial problems confronting the management of large and small businesses. The analysis and solution of the problems utilize the techniques and methods acquired in previous courses. The case system is used to give the student practice in linking up the related legal, accounting, and financial aspects of each situation. Prerequisite: Business Administration 418.

**435. Salesmanship. (3-0). Credit 3. I, II, S**

A consideration of the general principles of successful personal selling. Particular attention is given to personal requisites, qualifications, and training programs to enable the student to become a successful salesman. Prerequisites: Business Administration 205; Economics 203, 204.

**436. Sales Management. (3-0). Credit 3. II, S** †

A consideration of the problems confronting the modern sales executive; organization of sales departments, product research, selection and recruiting; compensation plans, routing, supervision, and costs connected with sales administration. Prerequisite: Business Administration 435.

**437. Applied Life Insurance. (3-0). Credit 3. II** †

This course presents the legal and social aspects of life insurance. Problems of reinsurance, company organization, and financial position are examined within their regulatory framework. Consideration is given to all forms of government life insurance and the benefits under the Social Security Act. A study of the elements of programming and the fundamental uses of settlement options are included. Prerequisite: Business Administration 320.

**438. Commercial Bank Management. (3-0). Credit 3. S**

Managerial problems and policy decisions that confront officers of financial institutions, organizations, capital structure, liquidity, solvency, primary reserves, secondary reserves, investment portfolio, loan policy, service charges, duties of the board. Course is oriented not only for the banker but also for the businessman in his relationship to his bank and savings and loan associations. Prerequisite: Economics 311.

**440. Real Estate Fundamentals. (3-0). Credit 3. I**

Basic factors and agencies which comprise the structure of our modern real estate development. A study of the historic, economic, legal, and financial aspects of realty and the effect of their interplay on the institution of real property, both urban and rural. Designed for the home and business property owner as well as for the professional real estate man.

**442. Real Estate Practice. (3-0). Credit 3. II**

A study of the practical techniques and procedures employed in real estate transactions, with emphasis on real estate appraisal, sales, finance, and industrial property management. Prerequisite: Business Administration 440 or approval of the instructor.

**445. Marketing Research. (3-0). Credit 3. I** †

A study of the nature and uses of marketing research in business. Emphasis is on methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: Business Administration 205, 303.

**446. Marketing Industrial Products. (2-0). Credit 2. II** †

Management aspects and economic factors affecting marketing policies are considered. Special emphasis is given to marketing research, marketing policies, channels of distribution, brand policy, pricing and control of marketing operations as they affect industrial products. A term project involving a report on the marketing of a specific industrial product is required of each student. Prerequisites: Business Administration 205, and Business Administration 303 or Mathematics 116.

**447. Advertising Procedures. (3-0). Credit 3. I**

Study of advertising procedures for newspapers, magazines, radio, and television. Specific topics include retail, mail order, national, and industrial advertising; advertising agencies; advertising research; and advertising campaigns. Prerequisite: Business Administration 208.

**452. Veterinary Jurisprudence. (3-0). Credit 3. II**

A study of Texas statutes and court decisions regulating and affecting the practice of veterinary medicine. One of the primary functions of this course is to prepare the student for the State Board Examination in veterinary law. Prerequisite: Senior classification in the School of Veterinary Medicine.

**456. Applied Salesmanship. (0-2). Credit 1. II**

A practical course in personal salesmanship. Analysis of specific products; planning and execution of the interview; psychological aspects of selling. Particular stress is made on sales demonstration and the strategy involved in closing the sale. Prerequisites: Business Administration 435; English 403.

**461. Retailing Building Products. (2-0). Credit 2. I**

A study of the special problems of the dealers in building products. Prerequisite: Business Administration 325.

**463. Employee Supervision. (2-0). Credit 2. II** †

A study of the relationships of the first level of management to supervisors and to the staff. The objectives, organization, and tools of the supervisory level; how to handle problems of grievances, absenteeism, discipline, morale, induction, safety, and training of workers. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Statement Analysis. (3-0). Credit 3. II, S**

An analytical study of the different kinds of statements for the guidance of executives, investors, and creditors; balance sheet and profit and loss ratios. Prerequisite: Business Administration 327 or 430.

**602. Consolidated Statements. (2-0). Credit 2. II**

Consolidated balance sheets, consolidated income and surplus statements, holding companies, mergers. Prerequisite: Business Administration 330. (Offered in 1960-61 and in alternate years thereafter.)

**603. Price Analysis. (3-2). Credit 4. I, S**

Economic concepts relating to prices, statistical methods of analyzing prices, supply and demand curves, elasticity of demand, price forecasting, study and criticism of works on price analysis. Term paper required on factors affecting the price of a commodity. Prerequisites: Business Administration 303; Economics 203, 204.

**604. Statistics. (3-2). Credit 4. II, S**

Curve fitting and empirical formulas. Multiple correlation, mathematical and graphic. Sampling and measures of unreliability. Chi-square test. Analysis of variance and covariance. Prerequisites: Business Administration 303; Mathematics 101. Mathematics 110 is recommended.

**605. Accounting Problems. (3-0). Credit 3. I**

A study of advanced accounting theory and problems dealing primarily with corporation accounting, assets and liabilities, analysis of statements, and cost accounting. The problems considered will be of the type currently stressed in accounting examinations. Prerequisite: Approval of instructor.

**606. Accounting Problems. (3-0). Credit 3. II**

A continuation of Business Administration 605. The topics will deal primarily with partnerships, fiduciaries, home office and branch, insurance, and auditing. Prerequisite: Approval of instructor.

**607. Market Analysis. (3-0). Credit 3. I**

A critical analysis of selected problems in the field of marketing. Each member of the class will be required to present a term report on some specific problem in the field of distribution. Prerequisites: Business Administration 205, 303.

**612. Advanced Taxes. (2-0). Credit 2. II**

A study of special income tax problems of taxpayers; Federal estate and gift taxes; Texas inheritance tax; Texas franchise tax on corporations; claims for refund of taxes; preparation of protests to deficiency assessments; planning for tax savings. Prerequisite: Business Administration 403. (Offered in 1959-60 and in alternate years thereafter.)

**616. Governmental and Institutional Accounting. (3-0). Credit 3. I, S**

A study of the accounting principles and procedures peculiar to governmental units and institutions. Prerequisite: Business Administration 328. Economics 412 is recommended.

**619. Legal Principles Relating to Accounting. (3-0). Credit 3. I, S**

An intensive study of legal principles emphasizing those which arise in the practice of accounting.

**620. Law and Business. (3-0). Credit 3. I**

Students write a paper on a topic of law in which they are interested, approved by instructor. Also, the following topics are covered: law and business, their relation to each other; present sources of law in Texas today; community property laws of Texas; collection of judgments in Texas; ad valorem taxes; automobile accidents and other topics relating to business. (Offered in 1960-61 and in alternate years thereafter.)

**621. Law of Municipal Corporations. (3-0). Credit 3. II**

A presentation of the general principles of the law of municipal corporations (city governments) in their relation to private business and the public at large, dealing with aspects of police powers, taxation, indebtedness, administration, public welfare, and legislative control. Prerequisite: Business Administration 305. (Offered in 1959-60 and in alternate years thereafter.)

**622. Trade Regulations. (3-0). Credit 3. II, S**

Delineation of governmental control intended to promote free competition and curb its abuses. A study of the Federal anti-trust acts and their application by the courts; the Federal Trade Commission and its method of dealing with unauthorized business practices such as unfair competition, misleading advertising, price discrimination, and retail price maintenance. Prerequisite: Business Administration 305.

**630. Problems of Corporation Finance. (3-0). Credit 3. I**

The financial problems of the profit-seeking corporation are discussed from the viewpoint of the corporate financial officer. Consideration is given to such matters as current financing, financial aspects of promotion, refunding operations, dividend policies, and corporate reorganization. The course is designed to exercise the principles of corporation finance. Prerequisite: Business Administration 418. (Offered in 1960-61 and in alternate years thereafter.)

**631. Business Investigation and Analysis. (3-0). Credit 3. II**

The problems arising in the quantitative and qualitative analysis of railroad, public utility, and industrial securities are presented so as to train the advanced student of investments in the use of the tools of security analysis. The text material is supplemented by the consistent use of representative sources of investment information. Prerequisite: Business Administration 418. (Offered in 1959-60 and in alternate years thereafter.)

**634. Statistical Method Applied to Business Problems. (3-0). Credit 3. II**

The use of statistical methods applied to sales control, cost studies, personnel management, forecasting sales and production of an individual concern, and forecasting general business activity. Readings, reports, and problems. Prerequisites: Business Administration 303, 604. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A critical examination of the subject matter presented in current periodicals, recent monographs and bulletins. Separate seminars will be conducted as required in fields such as accounting, finance, marketing, personnel administration, and statistics.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Directed study on selected problems not covered in the thesis research or in other courses. Prerequisites: Graduate classification; approval of instructor.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

# Department of Chemical Engineering

Professor J. D. Lindsay,
Professors W. D. Harris, C. D. Holland; Associate Professor W. B. Harris; Instructors R. R. Davison, W. J. Tomme, N. E. Welch

**204. Elementary Chemical Engineering. (3-0). Credit 3. I, II**

An introduction to the fundamentals of chemical engineering which involves the solution of elementary problems on the application of mass balances, energy balances, equilibrium balances, rate of approach to equilibrium, and economic balances. Prerequisites: Chemistry 102; Mathematics 210 or registration therein.

**304. Unit Operations. (3-0). Credit 3. I, II** †

A study of fluid and heat flow, evaporation and drying. Prerequisite: Chemical Engineering 204.

**314. Unit Operations Laboratory. (0-3). Credit 1. II** †

Laboratory work based on Chemical Engineering 304. Prerequisite: Chemical Engineering 304.

**409. Oil and Gas Technology. (3-0). Credit 3. I** †

Application of the principles of chemical engineering to the treatment and processing of petroleum and its products. Emphasis is on unit operations. Prerequisite: Chemical Engineering 423.

**423. Unit Operations. (3-0). Credit 3. II, S** †

A continuation of Chemical Engineering 304 covering distillation, gas absorption, filtration, size reduction, separation, and mixing. Prerequisite: Chemical Engineering 304.

**426. Plant Design. (2-6). Credit 4. II** †

The solution of problems involved in the design and development of chemical engineering plants. These problems cover such factors as the capacity, selection, and location of equipment, reaction rates, economic balances, specifications, drawings, cost estimates, and plant location. Prerequisite: Chemical Engineering 441.

**428. Industrial Chemical Processes. (3-0). Credit 3. II**

A study of representative chemical manufacturing processes and their relationships. Prerequisite: Chemical Engineering 441.

**429. Oil and Gas Technology Laboratory. (0-3). Credit 1. I** †

Laboratory work to accompany Chemical Engineering 409.

**433. Unit Operations Laboratory. (0-3). Credit 1. I** †

Laboratory work based on Chemical Engineering 423. Prerequisite: Chemical Engineering 314.

**441. Chemical Engineering Unit Processes. (3-0). Credit 3. I**

A study of such unit processes as sulfonation, nitration, hydrogenation, and alkylation, and the equipment required for them. Prerequisites: Chemical Engineering 423; Chemistry 228.

**454. Chemical Engineering Thermodynamics. (3-0). Credit 3. I** †

A study of the applications of thermodynamics to chemical engineering processes and operations. Prerequisites: Chemical Engineering 423; Chemistry 324.

**461. Process Control and Instrumentation. (2-0). Credit 2. I** †

A study of the fundamental principles and methods used in the measurement and control of the process variables such as pressure, temperature, and flow rate. Prerequisite: Chemical Engineering 423.

**464. Chemical Engineering Kinetics. (3-0). Credit 3. II** †

An introduction to the kinetics of reactions and the application of fundamental principles to the design and operation of commercial reactors. Prerequisites: Chemical Engineering 441, 454.

**481. Seminar. (1-0). Credit 1. I**

Oral discussion of selected topics from recent technical publications. Prerequisite: Senior classification.

**485. Advanced Problems in Chemical Engineering. Credit 1 to 5. I, II**

Special problems in chemical engineering are assigned to individual students or groups. The work may cover the numerous particular problems in chemical engineering processes or operations. It may be laboratory work or conference and discussion. Prerequisites: Chemical Engineering 423; approval of the Head of the Department.

## FOR GRADUATES

**605. Chemical Engineering Economics. (3-0). Credit 3. I**

Advanced calculations involving process design and process control as limited by least cost or maximum profit. Problems are based on the various unit operations and unit processes. Prerequisite: Chemical Engineering 423.

**606. Unit Operations. (3-0). Credit 3. II**

Applications of chemical engineering fundamentals in the manufacture of chemicals, refining petroleum, and other allied industries. Prerequisite: Chemical Engineering 423.

**607. Thermal Cracking. (3-0). Credit 3. I**

Application of fundamentals of chemical engineering to process calculation on thermal cracking. This includes process control and process design. Prerequisite: Chemical Engineering 606.

**608. Heat Transmission. (3-0). Credit 3. I**

Process and process design calculations on equipment involving the transfer of heat by conduction, convection, and radiation. Prerequisite: Chemical Engineering 423.

**611. Furnace Design. (3-0). Credit 3. II**

Process designs of furnaces. Involves radiant and convection heat transmission. Prerequisite: Chemical Engineering 608.

**612. Distillation. (3-0). Credit 3. I**

Process and process design calculations involving distillation of multicomponent and complex systems. Extractive and azeotropic distillation are covered. Prerequisite: Chemical Engineering 423.

**616. Estimation of Investment Cost. (2-0). Credit 2. II**

Simplified methods of estimating cost of process equipment in the preparation of preliminary appraisals. Prerequisite: Chemical Engineering 423.

**617. Unit Processes in Petroleum Refining. (4-0). Credit 4. I**

Calculations involving the effect of process variables on product yield and quality, rate of reaction, operating cost, and investment cost. Processes such as alkylation, isomerization, catalytic cracking, polymerization, thermal cracking, etc. will be covered. Prerequisites: Chemical Engineering 454, 616.

**618. Appraisal and Presentation of Chemical Engineering Data. (3-0). Credit 3. II**

Emphasis will be placed on analysis of experimental data. Practice is obtained by writing reports based on specific problems. Prerequisite: Chemical Engineering 423.

**619. Corrosion and Materials of Construction. (3-0). Credit 3. I**

The uses of materials of construction to preclude high corrosion rates in process equipment. Prerequisite: Chemical Engineering 423.

**623. Applications of Thermodynamics to Chemical Engineering. (3-0). Credit 3. II**

A study of the applications of thermodynamics to chemical engineering operations and processes. Prerequisite: Chemical Engineering 454.

**624. Chemical Engineering Kinetics I. (3-0). Credit 3. I**

A study of rates and mechanisms of chemical reactions. Thermal and catalytic reactions both homogeneous and heterogeneous are considered. Prerequisite: Chemical Engineering 423.

**625. Chemical Engineering Kinetics II. (3-0). Credit 3. II**

A study of the physical factors affecting chemical reaction rates and of methods for design of reaction equipment. Prerequisite: Chemical Engineering 624.

**626. Oil and Fat Technology. (3-0). Credit 3. I**

A study of the composition and properties of oils and fats, methods of extraction and purification, and their industrial utilization. Prerequisites: Chemical Engineering 423; Chemistry 228.

**627. Oil Mill Operation. (2-6). Credit 4. I**

A study of the theoretical and practical operating characteristics of the various units used in vegetable oil production. The economic factors of each unit and their over-all effect on plant operation will be covered. Prerequisite: Chemical Engineering 626 or registration therein.

**661. Nuclear Chemical Engineering. (3-0). Credit 3. I**

This course has to do with the applications of chemical engineering to reactors and the utilization and disposal of residual products therefrom. It will cover such problems as materials of construction, corrosion, industrial utilization of reactors, the influence of radiation on materials, and the utilization of radiation from reactor residues to influence chemical reactions. Prerequisites: Mathematics 308; Physics 312.

**662. Nuclear Material Processing. (3-0). Credit 3. II**

This course has to do with the special applications of unit operations and unit processes to the handling of nuclear fuels and residual products from nuclear reactors. It will cover such topics as distillation, gaseous diffusion separation, liquid-liquid extraction, liquid-solid extraction, gas-solid extraction, ion-exchange, adsorption separations, benefication and metallurgical processing. Prerequisites: Chemical Engineering 423; Mathematics 308.

**681. Seminar. (1-0). No credit. I, II**

Graduate students will be required to attend one hour per week to discuss problems of current importance in connection with their research.

**685. Problems. Credit 1 to 6. I, II, S**

Special work to suit individual or small group requirements. The work may cover the numerous particular problems in chemical engineering processes and operations. It may be laboratory work or conference and discussion. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Problems of unit operations and unit processes. For maximum credit comprehensive thesis must be prepared which is of sufficiently high calibre to permit a publication in the scientific and technical journals. Prerequisite: Approval of Head of Department.

## Department of Chemistry

Professor P. K. Calaway,
Professors J. K. Gladden, C. K. Hancock, E. B. Middleton, R. D. Whealy;
Associate Professors R. B. Alexander, J. B. Beckham, A. F. Isbell, A. W.
Jache, J. O. Page, Henry Rakoff, A. F. Schram, R. E. Snuggs, H. K.
Zimmerman, Jr., R. A. Zingaro; Assistant Professors D. R. Lee, E. A.
Meyers, R. H. Patton, N. C. Rose; Instructor W. W. Spurlock

**101. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

**102. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental theories of structure and activity. Practical application of the more important chemical processes involving metals described. Organic chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

**106. General Chemistry. (3-3). Credit 4. II**

A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

**207. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

A considerable portion of the classroom time is devoted to chemical calculation involved in the practice.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. Prerequisite: Chemistry 102.

**223. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

Stress is placed on the basic principles and theories of quantitative analysis, both gravimetric and volumetric. The treatment is not highly mathematical. The laboratory work is designed to illustrate basic techniques. Not open to engineering students. Prerequisite: Chemistry 102.

**225. Elementary Organic Chemistry. (2-0). Credit 2. I**

A study of the hydrocarbons and their relation to the field of petroleum. Prerequisite: Chemistry 102.

**226. Chemical Calculations. (2-0). Credit 2. I**

An advanced review of the chemical calculations of general chemistry with special emphasis on stoichiometry and chemical equilibrium. Prerequisite: Chemistry 102.

**227. Organic Chemistry. (3-3). Credit 4. I, II, S** †

An introduction to the chemistry of the compounds of carbon. A study of general principles and their application to various industrial processes.

The laboratory work serves as a basis of the course; the student here familiarizes himself with the reactions, properties, and relations of typical organic compounds. Prerequisite: Chemistry 102.

**228. Organic Chemistry. (3-3). Credit 4. I, II, S** †

A continuation of Chemistry 227. Prerequisite: Chemistry 227.

**231. Elementary Organic Chemistry. (3-0). Credit 3. I, II, S**

A study of the aliphatic series of organic compounds including an introduction to the benzene series and to vitamins, proteins, and related substances. Applications are taken from the field of agriculture. Not open to engineering students. Prerequisite: Chemistry 102.

**316. Quantitative Analysis. (2-6). Credit 4. I, II, S**

An introduction to the methods of exact analysis as preliminary training for the more advanced courses. In the classroom the practice and theory of the laboratory exercises are dealt with by lectures and recitations. Special attention is given to stoichiometry.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. The work is first volumetric, then gravimetric. In the early periods samples of known composition and purity are analyzed. Prerequisite: Chemistry 102.

**317. Quantitative Analysis. (2-6). Credit 4. II**

An introduction to the theory and practice of gravimetric, optical, and electrical methods of analysis. Prerequisite: Chemistry 316.

**323. Physical Chemistry. (3-3). Credit 4. I** †

Explanation and mathematical development of the theories and principles of chemistry. Topics discussed are atomic structure, gas laws, thermodynamics, thermochemistry, liquids, solutions, osmotic pressure, and colloids. Experiments in the laboratory substantiate the theories and principles developed in the classroom. Prerequisites: Chemistry 207 or 316; Mathematics 210.

**324. Physical Chemistry. (3-3). Credit 4. II** †

Intensive study of homogeneous and heterogeneous equilibria, the phase rule, chemical kinetics, catalysis, hydrogen-ion concentration, electrolytic and galvanic cells and electrochemistry, photochemistry, and radioactivity. Prerequisite: Chemistry 323.

**342. Physical Chemistry. (3-3). Credit 4. II** †

Explanation of basic chemical theories and principles with reference to their relationship to transformations in living matter. Special emphasis on such topics as atomic structure, diffusion and osmotic pressure, colloids, chemical equilibrium, catalysis, reaction velocity, hydrogen-ion concentration and its importance in biological processes. Prerequisites: Chemistry 207 or 316, and 227.

**344. Physical Chemistry. (3-0). Credit 3. I, II**

Structure of atoms, molecules, and crystals. Valence. Theories of polarity and ionization. Properties of gases, liquids, solids, and fugacities. Solubilities and properties of solutions. Study of colloids and surface energy. Equilibria. Electromotive force and oxidation potentials. Prerequisites: Chemistry 207; Mathematics 120 or 209; Physics 219.

**380. Chemical Bibliography. (1-0). Credit 1. II**

A study of the chemical library with instruction in the use of chemical journals, reference books, and other sources of information. Prerequisite: Junior classification.

**400. Instrumental Methods of Analysis. (2-3). Credit 3. I** †

A study of the theory and practice of modern techniques of chemical analysis and research. The laboratory work will illustrate the use of these instruments for routine analytical work and also their use as research tools. Prerequisite: Chemistry 317.

**447. Qualitative Organic Analysis. (2-6). Credit 4. I** †

The identification of the principal classes of organic compounds. Prerequisite: Chemistry 228.

**450. Colloidal Chemistry. (3-3). Credit 4. I** †

A study of the theories and preparation of disperse systems. Prerequisites: Chemistry 228, 324.

**461. Physical Chemistry. (3-0). Credit 3. I**

This course covers those topics in undergraduate physical chemistry which are not covered in Chemistry 323 and 324. The course content includes surface phenomena, colloids, atomic structure, molecular structure and properties. Prerequisite: Chemistry 324.

**462. Inorganic Chemistry. (3-0). Credit 3. I**

The periodic relationship of the elements, their compounds, principles of their bonding and applications. Prerequisite: Chemistry 324.

**463. Inorganic Chemistry. (2-3). Credit 3. II**

A continuation of Chemistry 462. Laboratory work consists of preparation and analysis of inorganic compounds designed to introduce the student to basic preparative techniques. Prerequisite: Chemistry 462 or approval of instructor.

**481. Seminar. (1-0). Credit 1. II**

Oral discussion of selected topics from technical publications.

**485. Problems. Credit 1 to 4. I, II, S**

An introduction to research, library, and laboratory work. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**600. Survey of Chemistry. (2-3). Credit 3. S**

A survey course in chemistry designed for teachers of high school chemistry. Prerequisites: Graduate classification; approval of Heads of Departments of Chemistry and of Education and Psychology.

**607. Organic Techniques and Preparations. (1-6). Credit 3. I**

A study of laboratory operations theory and a description and comparison of equipment used in advanced work. Application of techniques of organic chemistry is made in the laboratory. Prerequisite: Chemistry 646 or registration therein.

**608. Qualitative Organic Analysis. (1-6). Credit 3. II**

Analysis of organic compounds. Prerequisite: Chemistry 228.

**609. Theory of Organic Chemistry. (3-0). Credit 3. II**

The development and application of chemical theories to organic compounds. Prerequisite: Chemistry 646.

**611. Principles of Physical Chemistry. (3-0). Credit 3. I**

A study of the general principles of chemistry from the quantitative standpoint. The course will include a discussion of gases, liquids, and solutions. Prerequisite: Graduate classification.

**620. Principles of Chemical Analysis. (3-0). Credit 3. II**

An advanced survey of the principles of chemical analysis with special emphasis on the newer developments in the field of analytical chemistry. Prerequisite: Chemistry 400.

**621. Chemical Kinetics. (3-0). Credit 3. II**

Study of some of the present theories about chemical reaction rates and mechanisms. Prerequisite: Chemistry 324.

**624. Physico-Organic Chemistry. (3-0). Credit 3. I**

Mathematical and quantitative investigation of organic chemical phenomena. Prerequisite: Chemistry 609 or approval of instructor.

**625. Petroleum Chemistry. (3-0). Credit 3. II**

Practical and theoretical consideration of chemical reactions of petroleum hydrocarbons. Prerequisites: Chemistry 228, 324. (Offered in 1959-60 and in alternate years thereafter.)

**626. Thermodynamics. (3-0). Credit 3. I**

Theory and applications of classical thermodynamic functions. Prerequisite: Chemistry 324.

**628. The Non-Metallic Elements. (3-0). Credit 3. I**

Study of the non-metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**630. The Metallic Elements. (3-0). Credit 3. I**

Study of the metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**631. Statistical Thermodynamics. (3-0). Credit 3. II**

An introduction to the methods of statistical mechanics based primarily on Boltzmann statistics. The approach to thermodynamics through the partition function. The statistical concept of entropy. Prerequisite: Chemistry 626.

**635. Heterocyclic Compounds. (3-0). Credit 3. I**

Structure, preparation, and properties of heterocyclic compounds with special emphasis on those with biological activity. Prerequisite: Chemistry 228. (Offered in 1960-61 and in alternate years thereafter.)

**636. Electrochemistry. (3-0). Credit 3. II**

Advanced treatment of conductivity, electrochemical thermodynamics, galvanic cells, electrodeposition, and corrosion. Prerequisite: Chemistry 324.

**639. Instrumental Methods of Analysis. (2-3). Credit 3. II**

A study of the theory and practice of modern techniques of chemical analysis and research. The laboratory work will illustrate the use of these instruments for routine analytical work and also their use as research tools. Prerequisite: Chemistry 317.

**641. Structural Inorganic Chemistry. (3-0). Credit 3. I**

Study of nuclear and extranuclear structure, isotopes, valency of the elements, and sterochemistry of inorganic compounds. Prerequisites: Chemistry 324, 462. (Offered in 1959-60 and in alternate years thereafter.)

**642. Methods of Structural Chemistry. (3-0). Credit 3. II**

A study of theory, methods, and application of structural determination (arrangement and bonding) of chemical species. Prerequisite: Chemistry 641 or approval of the instructor. (Offered in 1959-60 and in alternate years thereafter.)

**643. Inorganic Complex Compounds. (3-0). Credit 3. II**

History, theories, and methods of investigations of inorganic complex compounds. Prerequisites: Chemistry 324, 462. (Offered in 1960-61 and in alternate years thereafter.)

**644. Quantitative Organic Analysis. (1-6). Credit 3. I**

Determinations: Macro Dumas, sulfur, Carius hologen, Micro residue, fractionation, Micro Dumas, catalytic hydrogenation, carbon and hydrogen, Micro Kjeldahl, Rast molecular weight, molar refraction, active hydrogen, alkaxyl, semi-micro saponification number. Prerequisites: Chemistry 228; reading knowledge of German.

**646. Organic Chemistry. (3-0). Credit 3. I**

A systematic and thorough presentation of organic chemistry on an advanced level. Prerequisite: Chemistry 228.

**648. Principles of Quantum Mechanics. (3-0). Credit 3. II**

A brief review of classical mechanics and the development of wave mechanics. The application of wave mechanics to some special chemical problems. Prerequisite: Approval of the instructor.

**661. Radiochemistry. (3-0). Credit 3. I**

A general course dealing with radioactive materials; their radiations; their preparation, purification, detection, identification, and their practical applications. Material on nuclear structures, nuclear transmutations, and radioactivity. Prerequisite: Chemistry 324 or 344.

**685. Problems. Credit 1 to 6. I, II, S**

This is a course in special topics to suit small group requirements. The work will deal with the more recent problems and results in the various branches of chemistry. It may be laboratory work or conference and discussion. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Civil Engineering

Professor S. R. Wright,
Professors J. B. Baty, F. J. Benson, S. J. Buchanan, B. M. Gallaway, E. L. Harrington, R. M. Holcomb, C. J. Keese, J. A. Orr, J. H. Sorrels, H. K. Stephenson, R. N. Traxler; Associate Professors T. R. Jones, Jr., R. E. Schiller, Jr., F. M. Smith; Assistant Professors W. A. Dunlap, T. J. Hirsch, R. A. Jiminez, W. R. McCasland*, Charles Pinnell, N. J. Rowan, E. P. Segner, Jr.; Instructors H. E. Fairbanks, B. D. Franklin, W. M. Moore, J. S. Noel*, R. M. Olson, R. P. Shubinski*

**201. Plane Surveying. (3-3). Credit 4. I, II**

Measurement of distances; use and care of surveying equipment; measurement of angles; land surveys and computations; stadia and plane table surveys; route surveys; horizontal and vertical curves; earthwork computations. Prerequisite: Mathematics 103.

**202. Advanced Surveying. (2-3). Credit 3. I, II**

Outlining reconnaissance, preliminary, and location of route surveys; computing and staking out simple and compound curves; cross-sectioning, earth work computations, mass curves; drainage areas, size of drainage structures; topographic mapping; profiles plans, and calculations of quantities for engineering projects. Prerequisite: Civil Engineering 201.

**206. Plane Surveying. (0-3). Credit 1. I, II**

Fundamental principles of surveying; use of transit and level; boundary surveys, area computations, profile surveys. Prerequisite: Mathematics 103.

**208. Topographic Surveying. (1-3). Credit 2. I, II**

Fundamental principles of surveying; use of transit and level; special emphasis placed on use of plane table in topographic mapping. Prerequisite: Mathematics 103.

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*On leave of absence.

**300. Summer Surveying Practice. Credit 5. S**

Six weeks of surveying practice. Horizontal and vertical control; base line measurements; transit-stadia surveys; plane table surveys; boundary surveys; area and coordinate computation; polaris and solar observations; route surveys. Stream gauging. Prerequisite: Civil Engineering 201.

**305. Mechanics of Materials. (3-0). Credit 3. I, II, S**

Stresses, deformations, mechanics of pipes, beams, shafts, columns, riveted joints, welded joints, elastic curves and deflections, moment areas, combined stresses, resilience. Prerequisites: Mathematics 210; Mechanical Engineering 212 or the equivalent.

**306. Mechanics of Materials. (2-0). Credit 2. I, II**

Principle stress relationships including graphical as well as analytical solutions; energy loads in beams; applications of moment area method; multiple integration method including graphical properties of integral curves; moment distribution method of analyzing statically indeterminate structures. Prerequisite: Civil Engineering 305.

**311. Hydraulics. (3-0). Credit 3. I, II**

The laws governing the action of water at rest and in motion, as related to engineering problems; the flow of water in pressure mains, sewers, aqueducts, open channels, and in rivers; measurement of the flow of water by nozzle, orifices, weirs and meters; flow of viscous fluids. Prerequisite: Mechanical Engineering 212 or equivalent.

**315. Strength of Materials Laboratory. (0-2). Credit 1. I, II**

Determination of the strength, ductility, modulus of elasticity, and other properties of engineering materials. Tests of timber, steel, cast iron, concrete, and reports showing results. Prerequisite: Civil Engineering 305 or registration therein.

**336. Hydraulics Laboratory. (0-2). Credit 1. I, II**

Calibration of nozzles, orifices, water meters, weirs, pressure gauges; measurement of pipe friction; measurement of pipe flow with pitot instrument and Venturi meter; efficiency tests on impulse motor, hydraulic ram, and centrifugal pump; solution of assigned problems. Prerequisite: Civil Engineering 311 or registration therein.

**338. Hydraulics of Drainage Structures. (2-0). Credit 2. I, II**

The elementary study of rainfall and run-off and the hydraulics of culverts and drainage structures; flow in open channels. Prerequisite: Civil Engineering 311.

**344. Plain and Reinforced Concrete. (2-3)*. Credit 3*. I, II, S**

Properties of concrete; plain concrete structures; theory of stress distribution in reinforced concrete in bending, shear, bond, and anchorage; design of typical beams, slabs, and walls; stress distribution in spiral and tied columns with axial and eccentric loading; design of typical columns; interpretation of typical current specifications and use of available tables and charts; economic factors. Prerequisites: Civil Engineering 306, 345.

**345. Theory of Structures. (2-3). Credit 3. I, II, S**

An introduction to structural engineering; loads, reactions, and structural force systems; algebraic and graphical computations of reactions, and forces in beams, three-hinged arches, and trussed structures used as roofs, floor systems, and bridges; influence lines and criteria for moving loads; analysis of indeterminate structures by the general deflection procedure; reactions and forces in bents. Prerequisite: Civil Engineering 306 or registration therein.

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*Becomes (3-3), credit 4 in February, 1961.

**346. Design of Members and Connections. (2-3). Credit 3. I, II, S**

The design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisites: Civil Engineering 306, 345.

**401. Water and Sewage Treatment. (2-2). Credit 3. I, II, S** †

Principles and methods of water purification and sewage treatment and disposal; laboratory demonstrations of control tests and correlation of results with treatment plant operation; interpretation of reports; inspections of local plants. Prerequisites: Chemistry 102; Civil Engineering 311.

**402. Water Supply and Sewerage Practice. (2-2). Credit 3. I, II** †

Development of sources of water supply; determination of the quantity of storm water and domestic sewage; short problems relating to water supply distribution systems, sewer systems, and the general features of water purification and sewage treatment plants; appurtenances and treatment plant equipment; local inspections of water supply and sewerage systems. Prerequisites: Civil Engineering 338, 401.

**403. Sanitary Design. (2-3). Credit 3. II** †

Practical problems in the design of sewer systems and appurtenances; sewage treatment plants; water collection and distribution systems; water purification plants. Prerequisite: Civil Engineering 402 or registration therein.

**406. Sanitation and Public Health. (3-0). Credit 3. I** †

Relation of sanitation to public health; residential water supply and excreta disposal methods; municipal sanitary work, including refuse disposal; plumbing; control of food supplies; mosquito, fly, and rodent control; sanitation of swimming pools; industrial hygiene; organization of health departments. Prerequisite: Junior classification.

**407. Highway Engineering. (3-0). Credit 3. I, II, S** †

An introduction to problems in location, design, drainage, construction, and maintenance of highways, streets, and pavements. Road laws, finances, highway organizations and supervision briefly considered. The text is supplemented by lectures, the use of bulletins, models, and samples of materials. Prerequisites: Civil Engineering 300, 338, 465 or registration therein.

**408. Municipal Administration. (3-0). Credit 3. I** †

City government, including the city manager plan; relation of city to state; administration of city departments; public utilities; city planning. Prerequisite: Junior classification.

**417. Bituminous Materials. (2-3). Credit 3. II** †

Origin, production, specifications, and tests of bituminous materials and mixtures used in the construction and maintenance of roads and pavements. Prerequisites: Senior classification in engineering and Civil Engineering 407 or registration therein.

**443. Materials of Construction. (1-3). Credit 2. I, II** †

Laboratory tests, supplemented with theory, of aggregates, cement, concrete mixtures, and masonry materials. Prerequisite: Senior classification.

**448. Engineering Economy. (2-0). Credit 2. I, II** †

Analysis of operating costs of engineering projects including interest, depreciation, fixed costs, overhead. Comparison of first cost economy versus ultimate economy. Prerequisite: Junior classification in engineering.

**456. Highway Design. (2-3). Credit 3. II**

Theory and practice in highway design. Highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements. Prerequisite: Civil Engineering 407.

**457. Traffic Engineering. (3-0). Credit 3. I, S** †

A study of vehicle operating characteristics, traffic flow, geometric design of roads, streets, and intersections, and methods of traffic control. Prerequisites: Civil Engineering 201, 407 or registration therein; Physics 219.

**458. Hydraulic Engineering. (3-0). Credit 3. II** †

Flow in pipes and complex pipe systems; non-uniform flow in open channels; pumping machinery; elementary hydraulic model theory. Prerequisite: Civil Engineering 338.

**463. Hydrology. (3-0). Credit 3. I** †

A study of the occurrences and measurements of precipitation and stream flow; relations between precipitation and run-off; estimating seepage; evaporation, run-off; surface, and flood discharges for drainage basins. Prerequisite: Civil Engineering 311.

**465. Soil Mechanics and Foundations. (2-2). Credit 3. I, II, S** †

An elementary introduction to soil mechanics and its application to the usual problems encountered in civil and architectural engineering. The origin, formation processes, and types of soils are reviewed. Methods of exploration and soil testing required for the design of various types of foundations, retaining walls, bridge abutments, coffer dams, earth dams, and other engineering structures. Prerequisites: Civil Engineering 305; Geology 320 or 422.

**468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

Definitions, functions, and identification of statically indeterminate structures; their uses, advantages, and disadvantages; general method of design; general method of analysis based on deflections; deflection computations for beams by elastic-curved-beam theory, moment areas, and conjugate beam; deflections of trusses by virtual work and Williot diagrams; preliminary designs; formulation and solution of simultaneous equations; superposition, final stresses; moment distribution; applications in the design of arches, rigid frames, and continuous beams. Prerequisite: Civil Engineering 345.

**470. Aerial Photogrammetry. (2-3). Credit 3. II** †

A study of photogrammetric optics, characteristics of aerial photographs, aerial cameras, map projections, ground control, radial plots, mosaics, interpretation of aerial photographs, stereoscopic plotting instruments, and mapping form from oblique photographs. Prerequisite: Civil Engineering 201.

**473. Cost Estimating. (3-0). Credit 3. I, II, S** †

Approximate and detailed estimates of the cost of construction projects including earthwork foundations, concrete, masonry, steel, and miscellaneous items. Costs are developed to include materials, equipment, labor, overhead, and profit. Prerequisite: Senior classification.

**474. Contracts and Specifications. (2-0). Credit 2. I, II** †

Study of types of contracts frequently encountered in engineering practice, including agency, tort, real estate, sales, transportation. Preparation of representative specifications and contractual documents for engineering projects. Prerequisite: Senior classification in engineering or architecture.

**478. Construction Plant and Methods. (3-0). Credit 3. I, II** †

Plant and equipment selection for earthwork, foundations, concrete and structural steel, based on performance and economy. Construction schedules, progress reports, and performance records. Prerequisite: Senior classification in engineering or architecture.

**481. Seminar. (1-0). Credit 1. I, II** †

A study of the methods of job procurement subsequent to graduation including letters of application and job interviews; responsibilities and obligations of the young civil engineer; professional ethics; membership in professional societies; professional registration; lectures by staff and practicing engineers. Prerequisite: Senior classification.

**483. Analysis and Design of Structures. (2-3). Credit 3. I, II** †

The over-all procedure of analysis and design, including functions, loads, layouts of force systems, analysis, design drafting, specifications, cost comparisons, and maintenance as applied to typical simple bridge and building structures, design of plate girders, trusses, and reinforced concrete buildings. Prerequisites: Civil Engineering 344, 346, 465.

**486. Design of Prestressed Concrete Structures. (2-3). Credit 3. II** †

Basic theory. Properties of materials used. Stress losses. Prestressing systems. Design of determinate beams for flexure, shear, bond, and bearing. Deflections. Design of slabs and of continuous beams. Circular prestressing. Tension and compression members. Connections. Current specifications and economics of design. Prerequisite: Civil Engineering 483.

## FOR GRADUATES

**601, 602. City Management. (4-0). Credit 4 each semester. I, II**

Development of European and American cities; forms of city government; functions of the city manager; administration of municipal affairs; organization of city departments; city finances; public utilities; fire prevention and protection; police administration; parks and playgrounds; public health and welfare; housing; city planning.

**603. Sewage Treatment and Stream Sanitation. (4-0). Credit 4. I**

Advanced studies of the theories of the various processes of sewage treatment, with special attention given to the details of the individual methods and units employed to effect these processes; and the requirements regarding the quality of sewage treatment plant effluents in relation to the sanitary protection of the receiving waters. Prerequisite: Civil Engineering 402.

**604. Water Quality and Treatment. (4-0). Credit 4. II**

Advanced studies of the characteristics of available sources of water, standards of quality of public water supplies, and the theories of treatment and purification processes, with special attention given to the details of the methods and units employed to effect these processes. Prerequisite: Civil Engineering 402.

**607, 608. Environmental Sanitation. (4-0). Credit 4 each semester. I, II**

Detailed study of environment and its relation to disease, covering malaria and its control; rodent control; sanitation of milk, shellfish, and other foods; collection and disposal of municipal refuse; sanitary aspects of air conditioning; housing sanitation, including plumbing and ratproofing; rural water supply and excreta disposal; sanitary inspection procedure.

**610. Industrial Wastes. (4-0). Credit 4. II**

Amount and characteristics of the common industrial wastes; their effects upon sewage treatment; methods of treatment. Prerequisite: Civil Engineering 401 or the equivalent.

**612. Transportation in City Planning. (2-0). Credit 2. S**

The importance and place of transportation in urban development and planning. The role of the engineer in planning. The relationship of transportation to planning studies, land use, zoning, planning legislation, and administration. Prerequisite: Graduate status in the School of Engineering.

**615. Structural Design of Flexible Pavements. (2-0). Credit 2. I**

Characteristics of pavement loads, stress analysis in flexible pavements, design practices, construction and maintenance. Prerequisite: Civil Engineering 407.

**617. Traffic Engineering: Characteristics. (2-3). Credit 3. I**

Advanced theory and practice of engineering studies of traffic characteristics. Methods of traffic administration. Prerequisite: Civil Engineering 457.

**618. Traffic Engineering: Operations. (2-3). Credit 3. II**

Advanced theory and application of traffic control and design of traffic facilities. Traffic regulations. Prerequisites: Civil Engineering 457, 617.

**619. Highway Problems Analysis. (2-3). Credit 3. II**

The theory and application of advanced techniques in statistics, aerial photogrammetry, and data processing in the solution of problems in highway and traffic design and research. Prerequisites: Industrial Engineering 458; Genetics 605 or Mathematics 414.

**620. Structural Design of Rigid Pavements. (2-0). Credit 2. II**

Theory of rigid pavement design, design practices, maintenance, and construction. Prerequisite: Civil Engineering 407.

**621. Advanced Reinforced Concrete Design. (3-3). Credit 4. II**

Creep, shrinkage, and temperature change effects in concrete. Deflections in reinforced concrete members. Combined bending and axial loads. Deep beams. Torsion in concrete members. Ultimate strength design methods. Retaining walls, rectangular tanks, circular tanks, and deep bins. Flat slab floor systems and bridges. Domes. Prerequisite: Civil Engineering 483.

**622. Hydraulics of Drainage Structures. (2-3). Credit 3. II**

Hydraulics of open channels, bridge openings, culverts, headwalls, surface street drainage, storm sewers, gutters, drop inlets and spillways. Theory of model studies as applied to drainage of highways, streets, and freeways. Prerequisite: Civil Engineering 338 or the equivalent.

**625. Geometric Design of Highways. (3-3). Credit 4. I**

The advanced theory and practice in highway design. Design controls and criteria, elements of design, design of alignment, cross-section, intersections and interchanges, multilane expressways, and drainage structures. Prerequisites: Civil Engineering 407, 465.

**627, 628. Hydraulic Engineering. (3-3). Credit 4 each semester. I, II**

Advanced hydrology, water power development, flood control, irrigation.

**629. Hydraulics of Open Channels. (3-3). Credit 4. I**

Advanced problems in uniform and non-uniform flow in open channels; the hydraulic jump; control section; backwater profiles.

**630. Ground Water Hydrology. (1-3). Credit 2. II**

A quantitative study of the application of the principles of hydrology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent, registration in 625.

**631. Advanced Structural Analysis. (3-3). Credit 4. I**

Review and correlation of the various procedures for analyzing indeterminate structures. The general method based on deformation limitations. Various methods of solving simultaneous equations. The neutral point and column analogy methods for fixed arches and frames. Moment distribution in complex structures. Plastic analysis. Prerequisites: Civil Engineering 468, 483.

**632. Advanced Design in Metals. (2-3). Credit 3. II**

Properties of high-strength and other special materials. Stress concentrations and fatigue. Ultimate strength. Reconsideration of selected specification rules in the light of theory, tests and new developments. Characteristics of thin-gauge structures. Design of complex members and connections such as: curved columns, fixed bases, and rigid-frame knees. Prerequisites: Civil Engineering 468, 483.

**633. Advanced Mechanics of Materials. (4-0). Credit 4. I**

Principal stresses and theories of failure of elastic action; stress concentrations; unsymmetrical bending; mechanical methods for study of internal stresses; thick-walled cylinders; torsion in non-circular cross sections; special problems such as bending in flat plates, buckling of webs, and bending in curved beams and hooks. Prerequisite: Civil Engineering 306.

**634. Airfield Planning and Design. (2-0). Credit 2. II**

Study of regional planning, air traffic routing, landing requirements, methods for development of master plans for site selection, airfield design requirements involving layouts, pavement selection, and design. Review and application of criteria of design of drainage for all types of fields.

**636. City Street Design. (2-0). Credit 2. S**

Street classification and function. Design of city streets, intersections, access drives, and pavements. Street drainage. Financing city street improvements. Prerequisite: Civil Engineering 407.

**640. Freeway Design and Operation. (2-0). Credit 2. S**

Characteristics of traffic flow on controlled access facilities. Advanced theory and practice in operation on freeways and related street systems. Freeway traffic control. Material based on advanced research of the Texas Transportation Institute. Prerequisite: Civil Engineering 618.

**647. Analysis of Three-Dimensional Structures. (3-3). Credit 4. I**

Stability and statics in three dimensions. Analysis of three-dimensional trusses by method of joints, methods of sections, Henneberg's method, and graphically. Applications to derricks, cranes, towers, and domes. Beams curved in space. Introduction to three-dimensional rigid frames, thin shells, and folded plates. Prerequisite: Civil Engineering 468.

**648. Design of Thin-Shell Structures. (2-3). Credit 3. II**

General theory. Membrane theory for shells without bending. Edge effects. Effects of unsymmetrical loading. Supporting structures. Applications in the design of shells of spherical, cylindrical, other surfaces-of-revolution, hyperbolic-parabaloid, and other shapes. Aesthetic, construction, and economic factors. Prerequisite: Civil Engineering 647.

**649. Soil Mechanics. (3-3). Credit 4. I**

A study of foundation materials as they exist and of the various types of soils, their physical properties, testing procedure, and principles of classification. For advanced undergraduates and for graduate electives. Prerequisites: Civil Engineering 465; Geology 320.

**650. Soil Mechanics. (3-3). Credit 4. II**

A study of theory and practice in foundation explorations, laboratory investigations of undisturbed foundation samples, stress distribution through soils; problems in foundation design, correlation of settlement data from actual observations on the behavior of existing structures, stability of embankments, backfill pressures. Prerequisite: Civil Engineering 649.

**651. Advanced Theory and Application of Soil Mechanics. (3-3). Credit 4. I**

Special lectures, discussions and applications of theory to solution of major problems encountered in practice of soil engineering, embracing the fields of seepage, earth work design, foundation design, port structures, and special problems. Prerequisite: Civil Engineering 650.

**653. Flexible Materials of Construction. (2-3). Credit 3. I**

Theory supplemented with laboratory tests of bitumen, tars, and plastics. Stabilization of base and subgrade materials. Advanced mix design and evaluation of test methods; rheology and chemistry of asphalt. Prerequisite: Civil Engineering 417.

**654. Rigid Materials of Construction. (2-3). Credit 3. II**

A study of physical and chemical properties of rigid materials of construction; laboratory tests of different kinds of concrete, tests of metals and laminates; theory of corrosion of ferrous metal; corrosion mitigation; shrinkage and plastic flow of stressed concrete; design of concrete mixtures for resistance to alkali reactive aggregates, blasts from jet planes, salt water, and cavitation in hydraulic works. Prerequisite: Civil Engineering 443.

**655. Prestressed Concrete Testing Laboratory. (1-3). Credit 2. I**

Demonstrations of the various types of tendons, anchoring devices, and prestressing equipment. Methods and equipment used in testing. Design, construction, and testing of prestressed beams, slabs, columns, and connections. Correlations with theory. Prerequisite: Civil Engineering 486.

**656. Concrete Structures. (1-3). Credit 2. II**

Methods and equipment used in testing reinforced concrete structures and elements of structures. Planning of tests, and testing of various beams and columns. Observations of behavior in compression, flexure, shear, torsion, and combinations thereof. Correlations with theory, both elastic and plastic. Prerequisite: Civil Engineering 621.

**657. Dynamic Loads and Structural Behavior. (3-3). Credit 4. I**

The forces resulting from wind, other moving fluids, earthquakes, blasts, impact, moving loads, and machinery. The dynamic behavior of various structures and structural elements under the action of such loads. Self-induced vibration. Design to minimize and resist such forces. Prerequisites: Civil Engineering 468, 483; Mechanical Engineering 459.

**658. Dynamic Structures Testing Laboratory. (1-3). Credit 2. II**

Observations of modes of vibration of structures and structural elements. Use of wind tunnel to determine wind forces. Stresses produced by moving loads on bridges. Correlations with theory. Prerequisite: Civil Engineering 657.

**660. Design of Folded-Plate Structures. (1-3). Credit 2. II**

Characteristics and uses; aesthetic, construction, and economic factors. Design procedure for long, shallow structures. Approximate procedure for short, deep structures. End diaphragms. Effects of intermediate diaphragms. Triangular plates. Combined stresses. Buckling of thin elements. Prerequisite: Civil Engineering 631.

**661. Structures Testing Laboratory Techniques. (1-3). Credit 2. I**

Methods and equipment for testing and for observing strains and deflections. Practice in the use of machines and equipment. Design of experiments, preparation of specimens, and observation of physical behavior. Correlations with theory. Prerequisite: Civil Engineering 483.

**662. Metal Structures Testing Laboratory. (1-3). Credit 2. II**

Planning tests, tests and observations of more complex metal structures and elements. Unsymmetrical bending, web buckling in beams and columns, lateral buckling of beams. Stress distribution at bends, corners, and abrupt changes. Plates and shells. Correlations with theory. Prerequisites: Civil Engineering 633, 661.

**663. Theory of Elastic Stability. (4-0). Credit 4. I**

Primary buckling of centrally or eccentrically loaded columns; primary buckling of centrally loaded columns by torsion; built-up columns; lateral buckling of beams; stability of web plates of girders; local buckling of plate elements of columns. Prerequisite: Civil Engineering 633 or the equivalent.

**666. Foundation Structures. (3-3). Credit 4. II**

The structural analysis and design of foundations. Spread footings, combined footings, and raft foundations. Retaining walls, piles, and pile foundations. Sheet-pile structures, cofferdams, wharves, and piers. Bridge piers and abutments. Prerequisites: Civil Engineering 483, 649.

**667. Highway Structures. (3-3). Credit 4. I**

The structural analysis and design of bridges, grade separation structures, retaining walls, and culverts. Review of functional and aesthetic requirements. Loads, materials, comparisons of different types, and economic proportions. Current standards, new developments, and current cost information. Prerequisites: Civil Engineering 483, 625.

**669. Bituminous Technology. (2-0). Credit 2. I, II**

A review will be made of the methods and techniques used in evaluating the chemical, physical, colloidal and rheological properties of asphaltic materials. The available data will be discussed and a study made of the methods for evaluating durability of asphalt. The original literature will be used for assigned reading. Prerequisite: Civil Engineering 417.

**670. Bituminous Technology. (2-0). Credit 2. I, II**

A study will be made of procedures used in selecting and processing crude oil for the manufacture of asphalt. The fundamental properties of asphaltic cutbacks, asphalt emulsions and mineral filled bitumens will be reviewed. The requirements of asphalts for use in roads, roofing and special applications will be studied. Original source material will be used. Prerequisites: Civil Engineering 417, 669.

**671. Urban Transportation Planning. (2-0). Credit 2. S**

The urban transportation problem. Techniques of estimating demand for traffic facilities. Special studies required in transportation planning. Prerequisites: Civil Engineering 617, 618.

**672. Urban Transportation Planning. (2-0). Credit 2. S**

Problems of mass transportation. Study of the central business district, suburban shopping centers and terminal planning. Street and subdivision transportation system planning. Urban transportation economics, financing, and administration. Prerequisite: Civil Engineering 671.

**681. Seminar. (0-2). Credit 1. I, II**

Reports and discussion of current research and of selected published technical articles. May not be taken for credit more than once in a Master's degree program and twice in a Ph.D. program. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

A course offered to enable majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by other courses in the established curriculum. Credit for this course normally will be limited to four credits per semester, but in exceptional circumstances, the Head of the Department may approve a maximum of six credits in one semester or summer term.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Dairy Science

Professor I. W. Rupel,
Professors R. E. Leighton, A. V. Moore; Associate Professors I. I. Peters, Carl Vanderzant; Assistant Professor M. A. Brown

**202. Dairying. (2-2). Credit 3. I, II**

A survey of the dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. Food value of milk, tests for composition and quality, utilization and processing of market milk and dairy products. Prerequisite: Chemistry 101.

**301. Market Milk. (3-2). Credit 4. I** †

Nutritional value of milk; milk and public health; organization of city milk supplies; processing, distribution, and inspection of market milk. Prerequisites: Biology 206; Dairy Science 202.

**303. Dairy Cattle Judging. (0-3). Credit 1. I**

A study of comparative judging of dairy cattle. Economic value of dairy type. Student contest and commercial judging techniques. Prerequisite: Dairy Science 202.

**307. Judging Dairy Products. (0-3). Credit 1. II**

Practice in judging and scoring dairy products according to consumer preference, established student contest, and commercial standards. Prerequisite: Dairy Science 202.

**310. Advanced Dairy Cattle Judging. (0-2). Credit 1. II**

Advanced dairy cattle judging with particular attention to show ring type and breed registry association classification. Prerequisite: Dairy Science 303.

**311. Technical Control of Dairy Products. (2-6). Credit 4. II** †

Methods of analysis of milk and milk products, and their use in controlling the composition and quality of dairy products. Prerequisites: Chemistry 223, 231; Dairy Science 301.

**316. Butter and Cheese Manufacture. (3-4). Credit 4. II** †

Processing procedures in the commercial manufacture of domestic and foreign cheeses; creamery butter manufacture. Prerequisites: Dairy Science 301, 320. (Offered in 1960-61 and in alternate years thereafter.)

**320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

Relation of micro-organisms to quality in milk and milk products; starter and fermented milk culture management; sanitary control on farms and in commercial dairies; standard analytical procedures according to the American Public Health Association. Prerequisite: Biology 206.

**324. Commercial Dairy Products. (3-0). Credit 3. II**

A modification of Dairy Science 316, 407, 415. Prerequisite: Dairy Science 202. (Offered in 1959-60 and in alternate years thereafter.)

**326. Food Preservation and Decomposition. (3-3). Credit 4. II** †

The microbiology of human foods and accessory substances. A study of raw and processed foods, emphasizing the physical, chemical, and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: Biology 206.

**407. Ice Cream Manufacturing. (2-3). Credit 3. I** †

The manufacture of ice cream, sherbets, and ices, and the physical and chemical principles involved; ice cream plant equipment; flavoring materials; merchandising. Prerequisites: Agricultural Engineering 213; Dairy Science 202.

**410. Dairy Plant Management. (1-2). Credit 2. II** †

Dairy plant operating efficiency. Special economy problems related to the handling of fluid milk, butter, cheese, and concentrated dairy products. Prerequisite: Senior classification in dairy science.

**415. Condensed and Powdered Milk. (2-2). Credit 3. I** †

The manufacture and distribution of condensed and evaporated milk, milk powder, milk sugar, casein, and other milk products. Prerequisites: Chemistry 231 or equivalent; Dairy Science 301; one semester of physics.

**417. History and Development of Dairy Cattle. (2-2). Credit 3. I** †

The breeding and development of a dairy herd, including artificial breeding, selection of breeding animals, production testing and type classification, breeding programs, herd analysis, and a review of the development of the breeds. Prerequisites: Dairy Science 202; Genetics 301.

**418. Feeding and Management of Dairy Cattle. (3-2). Credit 4. II** †

The feeding, care, and management of the dairy herd; calf raising, developing the dairy heifer, care of dry and fresh cows, feeding for milk production, disease control, silage, buildings, and related topics. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 401; Dairy Science 202.

**420. Dairy Management. (1-2). Credit 2. II**

Feeding, care and management of dairy cattle, including herd improvement through breed selection, feeding for milk production, development of replacement stock and disease control. For agricultural education majors only. Prerequisites: Animal Husbandry 303; Dairy Science 202; Genetics 301.

**481. Seminar. (1-0). Credit 1. I, II** †

A review of current dairy literature and presentation of papers on selected dairy topics. May be elected a second time for one additional credit. Prerequisite: Senior classification.

**485. Special Problems. Credit 1 to 4. I, II** †

Special problems in dairy production or dairy manufactures. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**601, 602. Dairy Production. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy production, feeding, breeding, and management. Prerequisite: Dairy Science 418.

**603, 604. Dairy Manufactures. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy manufactures. Prerequisites: Dairy Science 316, 407, 415.

**609. Dairy Cattle Breeding and Management. (3-0). Credit 3.** S

Advancements in dairy cattle feeding, breeding, management, and commercial milk production. A three-week course for agricultural workers offered in summer sessions only. Not open to dairy science majors. Prerequisite: Dairy Science 418 or 420 or approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A study of research methods and a review of scientific literature dealing with individually selected problems in production or manufactures and not pertaining to thesis or dissertation. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research leading to thesis or dissertation in the respective fields of dairy production and dairy manufactures. Prerequisite: Graduate classification.

## Department of Economics

Professor A. F. Chalk;
Associate Professors J. E. Hibdon, E. E. Liebhafsky, H. R. Putnam;
Assistant Professors C. A. Bitner, Jr., M. H. Butler, M. G.
Daniels*, J. N. Slater, L. H. Stern

**203. Principles of Economics. (3-0). Credit 3. I, II, S**

An introductory survey course designed to acquaint the student with elementary principles of economics; the economic problem, the measurement and determination of national income, money and banking, and the theory of price. Prerequisite: Sophomore classification.

**204. Principles of Economics. (3-0). Credit 3. I, II, S**

A second course in elementary economics with primary emphasis upon analysis of economic aggregates, the theory of production and of the firm, international economic relations and labor problems. Prerequisite: Economics 203.

**311. Money and Banking. (3-0). Credit 3. I, II, S**

The fundamental principles of money, credit, and banking and their exemplification in modern currency and banking history, particularly that of the United States. Special attention is given to present-day conditions and problems. Prerequisite: Economics 203.

**318. Economics of Labor. (3-0). Credit 3. I, II, S**

Special attention is given to the labor force, unemployment, labor markets, wages, work periods, the aged worker, industrial accidents, and phases of social security. Prerequisites: Economics 203, 204.

**319. Economic Development of the United States. (3-0). Credit 3. II**

A survey of the economic development of the United States from colonial times to the present. The course will describe the origin and development of our economic and social institutions and provide a basis for an understanding of our present economic problems. Prerequisite: Economics 203.

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*On leave of absence.

**320. Economic Development of Europe. (3-0). Credit 3. II**

A survey of the steps by which economic activities have evolved from the Medieval period into the complex capitalistic economy of today. Special emphasis on the development of the wage system, the Industrial Revolution, the expansion of markets, the ebb and flow of industrial activities, the financial structure, and the relation of industrial development to political policy. Prerequisite: Economics 203.

**321. International Trade and Finance. (3-0). Credit 3. I** †

A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisite: Economics 203.

**323. Economic Analysis. (3-0). Credit 3. I** †

The importance of prices in directing production and distributing income under both competitive and monopolistic market situations is considered, along with a survey of the effects of governmental policies on the pricing system. Prerequisites: Economics 203, 204.

**324. Comparative Economic Systems. (3-0). Credit 3. I**

A study of the economic systems of the leading nations. Prerequisite: Economics 203.

**412. Public Finance. (3-0). Credit 3. II** †

A survey of all aspects of government finance. The main topics studied are public expenditures, taxation, public debt, and financial administration at federal, state, and local levels. Attention will be given to spending and borrowing policies of the government, and the role of taxation as an instrument of fiscal policy. Prerequisites: Economics 203, 204, 311.

**424. Economics of Transportation. (3-0). Credit 3. II**

A description of the structure and functioning of our highway, rail, water, and air transportation systems; the economic significance of transportation in our society; and an analysis of the theory and practice of regulation of the transportation industries by the Interstate Commerce Commission and other governmental agencies. Prerequisite: Economics 203.

**435. Economics of Collective Bargaining. (3-0). Credit 3. I** †

Analysis of collective bargaining as an evolutionary process and the effect of negotiated wages and supplementary benefits upon labor mobility, productivity, managerial efficiency, and the economy as a whole. Prerequisite: Economics 318 or approval of the Head of the Department.

**437. Government and Labor Relations. (2-0). Credit 2. II** †

A study of court decisions and laws regulating and protecting labor in the interest of national welfare with attention given to the social and economic environment in which such regulations were developed. Special attention is given to the major legislative acts of Congress and some of the state laws pertaining to labor relations, with some attempt to evaluate these in the light of a changing conception of labor relations. Prerequisite: Economics 318 or approval of the Head of the Department.

**440. Latin-American Trade. (3-0). Credit 3. II** †

A study of Latin-American trade and commercial policies, together with an analysis of the economic problems of this region. Prerequisite: Economics 321 or approval of the Head of the Department.

**443. Contemporary Economic Problems. (3-0). Credit 3. II** †

A study of current economic problems which lie within the following major areas of economic policy: economic stability, control of monopoly power, distribution of income, and international economic relations. Prerequisites: Economics 203, 204.

**481. Seminar. (1-0). Credit 1. II** †

Primarily for students majoring or minoring in economics. A study of methodology, scope, and philosophy of economic science, followed by individual investigation of some current economic problems. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. History of Economic Thought. (4-0). Credit 4. I**

Primary emphasis is given to the classical period of 1776-1848, although a brief survey of pre-classical economic thought is made at the beginning of the course. Students are expected to read extensively in original sources, and special attention is devoted to the works of Smith, Malthus, West, Ricardo, and Mill. Prerequisite: Approval of the Head of the Department.

**602. History of Economic Thought. (4-0). Credit 4. II**

Following a general survey of the wage-fund controversy, an intensive study is made of marginal utility theory as developed by Menger, Jevons, Boehm Bawerk, etc., followed by the neo-classical period. The final portion of the course is devoted to the synthesis of classical and marginal utility theory found in Marshall's system. Prerequisite: Approval of the Head of the Department.

**606. Economics of Labor. (4-0). Credit 4. II**

A survey of theories of the labor movement is followed by analysis of wage and employment theories, the effect of union policies and practices upon wages and employment, and the role of unionism in economic stability. Prerequisite: Economics 318.

**607. Contemporary Economic Theory. (4-0). Credit 4. II**

This is a survey of the more important contributions to economic thought which have been made during the last generation. The current writings of important contemporary economists are read and evaluated. Prerequisite: Economics 323.

**611. Government Fiscal Policy. (4-0). Credit 4. I**

This course concerns the development of modern national income analysis and the role of fiscal policy in promoting economic stability.. The conceptual problems of measuring national income are considered, analytical systems explaining the determination of national income are surveyed, and contemporary policy recommendations for the maintenance of full employment without inflation are discussed. Prerequisite: Economics 412 or approval of Head of Department.

**613. International Economic Policies. (3-0). Credit 3. II**

A critical examination of governmental policies toward international trade both at home and abroad; includes study of the role of the individual and the state in foreign trade; examines export and import controls, exchange control and exchange stabilization funds; considers tariff and rehabilitation policies of the government and their relation to foreign trade. Prerequisite: Economics 321.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual problems not related to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in economics; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research.

## Department of Education and Psychology

Professor G. P. Parker,
Professors D. F. Parry, W. A. Varvel; Associate Professors M. S. Kavanaugh,
S. A. Kerley; Assistant Professors D. G. Barker, D. M.
Estes, P. R. Hensarling, J. E. Murray

### EDUCATION

**121. An Introduction to Education. (3-0). Credit 3. I, II**

A survey course in the social foundations of American education.

**321. Secondary School Methods. (3-0). Credit 3. I, S**

Methods of teaching high school subjects; for students who expect to teach in secondary schools.

**421. History and Philosophy of Education. (3-0). Credit 3. I, S** †

An evaluation of the educational achievements of the various nations and people of the western world; the development of the social, religious, political, and cultural beliefs and attitudes that underlie American education today. Prerequisite: Six hours of education.

**425. Supervised Student Teaching. (2-12). Credit 6. I, II**

Observation and participation in classroom activities. Techniques of teaching the student's special subjects. Two hours per week devoted to student's problems. Preparation of units of work preparatory to teaching. Supervised teaching. Prerequisites: Senior classification; approval of the Head of the Department.

**426. Tests and Measurements. (3-0). Credit 3. II, S** †

The development of scientific measurement. The fundamental principles of sound measurement and an intensive study of the methods of appraising achievements of instructional objectives. Primary emphasis upon methods of constructing teacher-made objective tests and techniques for improving other types of written examinations. Prerequisite: Education 321 or the equivalent.

**427. Principles of Guidance. (3-0). Credit 3. I, S** †

Introduction to the field of guidance and student personnel work. Treatment of principles underlying the aims, methods, and instruments employed in counseling and guidance. Attention to relationship of instruction and guidance. Prerequisite: Psychology 301 or a course in general psychology.

**436. Organization and Administration of the Elementary School. (3-0). Credit 3. S** †

The functional study of the participation in, and the organization and administration of the elementary school. Designed to meet the needs of elementary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education.

**437. Organization and Administration of the Secondary School. (3-0). Credit 3. II, S** †

The functional study of the participation in, and the organization and administration of the secondary school. Designed to meet the needs of secondary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education or the equivalent.

**439. Educational Statistics. (3-0). Credit 3. I, S** †

Statistical techniques for classroom teachers, principals, students of psychology and education, and educational research workers. Problems originating in classrooms, offices of principals, laboratories of educational investigators will be used for illustrative materials and exercises. Not open to students who have received credit for any other course in statistics. Prerequisite: Six hours of advanced education.

**443. Elementary School Curriculum. (3-0). Credit 3. S** †

Curriculum problems as they relate to the growth, development, and adjustment of the child in the elementary school. Emphasis given to the study of curriculum materials and to the resource unit approach within the modified elementary curriculum structure. Prerequisite: A previous course in elementary school methods.

**444. Secondary School Curriculum. (3-0). Credit 3. I, S** †

Inquiry into current curriculum practices and their backgrounds, basis for curriculum reorganization, emphasis upon the resource unit approach within the modified curriculum structure. Prerequisite: Education 321 or the equivalent.

## FOR GRADUATES

**601. College Teaching. (2-0). Credit 2. I**

Conceptions of higher education underlying typical programs including general education, the learning process, and effective use of techniques and instrumentalities of classroom instruction. Prerequisite: Graduate classification.

**607. Programs and Procedures in Supervision. (3-0). Credit 3. II, S**

Designed for teachers, supervisors, and administrators. Deals with the philosophy, organization, and administration of supervision of both the elementary school and the secondary school. Prerequisites: Education 321, 444 or the equivalent.

**608. Administration of Local School Finance. (3-0). Credit 3. II, S**

A study of school funds on the local school level: sources, budgeting, systems of accounting and reporting. Supply management as related to school efficiency.

**609. Public School Laws. (3-0). Credit 3. II, S**

A review of the constitutional provisions, statute laws, court decisions, and regulations governing the public schools, with special reference to Texas.

**610. Pupil Accounting. (3-0). Credit 3. I**

A study of devices to record and improve census taking and attendance; classification and promotional schemes; school record systems; school reports and pupil appraisal studies; marking systems.

**613. The School Plant. (3-0). Credit 3. II, S**

A study of plans for determining the extent and character of present and future building and equipment needs of a school unit; efficiency of present plant; operation and maintenance; planning the building program.

**615. Structural Organization and Administration. (3-0). Credit 3. I, S**

A study of educational administration in the United States through an analysis of the nature of the educational function, consideration of the implications of democracy, and the legal relations of formal education to the democratic state. Emphasis will be given to the structural organization and administration of state and local school systems. Prerequisites: Education 437; graduate classification.

**616. Administration of Staff Personnel. (3-0). Credit 3. I, S**

A study of selection, salary schedules, tenure, and promotion of teachers, including in-service training; efficiency records and ratings.

**623. Standardized Tests and Measurements. (3-0). Credit 3. I**

Use of standardized tests in instruction and guidance. Study of various tests of achievement, aptitude, interest, and personality. Methods of construction, experimental trial, and standardization of published tests. Interpretation of test results. Prerequisite: Education 426 or 439, or the equivalent.

**624. Individual Testing. (2-3). Credit 3. I**

Practicum in administration and interpretation of Stanford-Binet and Wechsler-Bellevue intelligence tests. Introduction to individual tests of personality. Prerequisites: Education 426 or 439; 623 or registration therein.

**625. Practicum in Secondary Education. (2-3). Credit 3. I**

A course designed for secondary school teachers in which a study is made of current problems of the secondary school. The student with the advice of the instructor, will select an individual problem from the following areas: planning, including the school survey; curriculum development; life adjustment education; education for out-of-school youths and adults; evaluative criteria; counseling; supervision; citizens' committee for the public schools. Prerequisites: Individual approval; teaching experience.

**626. Practicum in Secondary Education. (2-3). Credit 3. II**

This is a continuation of Education 625. The student selects an individual secondary school problem different from the one used for Education 625.

**627. Practicum in Elementary Education. (2-3). Credit 3. I**

A course designed for elementary school teachers in which a study is made of current problems of the elementary school. The student with the advice of the instructor, will select an individual problem from the following areas: evaluation; a detailed study of testing programs; curriculum development in specific areas; health and safety education; child growth and development; improving teaching techniques; counseling; supervision; school and community programs. Prerequisites: Individual approval; teaching experience.

**628. Practicum in Elementary Education. (2-3). Credit 3. II**

This is a continuation of Education 627. The student selects an individual elementary school problem different from the one used for Education 627.

**629. Practicum in Counseling and Guidance. (2-3). Credit 3. II**

Supervised practice in individual counseling and group guidance. Cases assigned in Basic Division and local public schools. Prerequisites: Education 624, 631.

**631. Techniques of Counseling. (3-0). Credit 3. II**

Methods of gathering, analyzing, and interpreting case data in counseling. Analysis of dynamics of counselor-counselee relationship. Interviewing techniques. Use of test results in counseling. Prerequisites: Education 427 or 635, 623; Psychology 634.

**632. Educational and Occupational Information. (3-0). Credit 3. II, S**

Sources, classification, and analysis of educational and occupational information. Occupational trends, local occupational surveys. The use of occupational information by the classroom teacher and the guidance specialist.

**633. Methods of Group Guidance. (3-0). Credit 3. I, S**

Methods and practices in group guidance. The homeroom, classroom, and school clubs as opportunities for guidance. Prerequisite: Education 427 or 635.

**635. Organization and Administration of Pupil Personnel Services. (3-0). Credit 3. I, S**

A course for administrators, counselors, supervisors, and teachers designed to help them develop an understanding of the role of pupil personnel services; responsibility for the techniques of evaluating the program of pupil personnel services. Prerequisite: Graduate classification.

**637. Advanced Elementary School Methods. (3-0). Credit 3. S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the elementary school level. Prerequisite: Twelve hours in elementary education or an elementary school certificate.

**638. Advanced Secondary School Methods. (3-0). Credit 3. II, S**
A study of teaching methods, devices, and techniques of learning-teaching situations on the secondary school level. Prerequisite: Twelve hours of secondary education or a secondary school certificate.

**639. Processes in Educational Leadership. (3-0). Credit 3. II, S**
An analysis of the skills and techniques of the administrator in the modern school, with emphasis on democratic leadership, teacher-administrator relationships, group processes, and evaluation of the administrative programs. Prerequisite: Twelve hours of advanced education.

**640. School-Community Relationships. (3-0). Credit 3. II, S**
Considers the total educational and social patterns of living which exist in any community. The home, the school, the church, clubs, recreation centers, and all agencies of the community are conceived collectively as dominating educational influences in the life of the child. Prerequisites: Twelve hours of advanced education; graduate classification.

**681. Seminar. (1-0). Credit 1. II**
Problems pertinent to the superintendent, principal, counselor, supervisor, and visiting teacher are selected. Recent developments and research in the different areas will be presented. Prerequisites: Eighteen hours of advanced education; approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**
A directed individual study of a selected problem in the field of education. Prerequisite: Graduate classification in education.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis.

## PSYCHOLOGY

**207. General Psychology. (3-0). Credit 3. I, II, S**
An introductory course dealing with the elementary principles of human behavior. Designed especially for those students majoring in the social or biological sciences, in pre-medicine, or in education. Credit cannot be obtained for both Psychology 207 and 303.

**301. Educational Psychology. (3-0). Credit 3. I, II, S**
The application of psychology to the problems of teaching. The nature and operation of the laws of learning; transfer of training; nature, measurement, and significance of individual difference; conditions that influence efficiency of learning.

**303. Psychology for Technical Students. (3-0). Credit 3. I, II, S**
An introductory course emphasizing the applications of general psychology. Designed for students of agriculture, business administration, and engineering. Credit cannot be obtained for both Psychology 207 and 303.

**305. Personality Adjustments. (3-0). Credit 3. I**
Emphasis upon adjustment problems of normal people. Principles of mental hygiene in relation to family, school, and community life. Prerequisite: Psychology 207, or 301, or 303.

**307. Child Growth and Development. (3-0). Credit 3. II**
Growth and development of the normal child from infancy to adolescence with emphasis upon the elementary school years. Prerequisite: Psychology 207, or 301, or 303.

**323. Psychology of Adolescence. (3-0). Credit 3. I, II, S**
The psychological problems of the normal teen-age individual, including the consideration of the ways and means of aiding youth to meet these problems constructively. Prerequisite: Psychology 207, or 301, or 303.

**401. Industrial Psychology. (3-0). Credit 3. I, II, S**

Significance of individual differences in industry; instruments and techniques of selecting and placing personnel; motivating, training, and supervising the worker; nature and control of fatigue; psychological aspects of labor relations; morale and attitude measurement; industrial counseling. Prerequisite: Psychology 207, or 303, or advanced standing in industrial engineering or industrial technology.

**403. Dynamics of Human Behavior. (3-0). Credit 3. II** †

The motivation of behavior and the mechanisms of adjustment to conflict. Types of maladjustment and their causation. The development and integration of the personality. Theories of personality. Prerequisites: Psychology 207 or 301 or 303, and 305 or graduate classification in education or sociology.

### FOR GRADUATES

**634. Principles of Human Development. (3-0). Credit 3. I, S**

Biological, psychological, and cultural interrelationships in human development. Emphasis upon principles and methods as illustrated in research and theoretical contributions. Experiences in procedures of child study. Prerequisite: Graduate classification.

## Department of Electrical Engineering

Professor G. D. Hallmark,
Professors H. C. Dillingham, J. P. German, L. M. Haupt, Jr., M. C. Hughes*, N. F. Rode, R. P. Ward; Associate Professors J. S. Denison, A. J. Druce; Assistant Professors M. G. Rekoff, Jr., E. N. Roots, Jr.; Instructors B. J. Ball, H. M. Barnard, G. E. Fridel, J. O. Hebert, Jr., W. P. Worley

**201. Electricity and Magnetism. (3-4). Credit 4. I, II**

Lectures, recitations, and problems in electricity and magnetism.

A laboratory investigation of the phenomena studied in the textbook. Prerequisite: Mathematics 120 or 209.

**214. Electrical Circuit Theory. (3-3). Credit 4. I, II, S** †

An introduction to electrical circuit theory. Complex numbers, phasor algebra, and response of single mesh and series-parallel circuits. Resonance phenomena and the poles and zeros of impedance and admittance are defined. Prerequisites: Electrical Engineering 201; registration in Mathematics 307.

**305. Electrical Circuits and Machines. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of electrical circuits, including fundamental electronic circuits, machines, and control devices. The practice is designed to familiarize the general engineering student with test procedures for and characteristics of both direct and alternating current machines. Prerequisites: Mathematics 210; Physics 219.

**307. Electrical Circuits. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of direct and alternating current circuits.

The practice includes measurements of the circuit phenomena, including fundamental amplifiers and rectifiers. Prerequisites: Mathematics 210; Physics 219.

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*On leave of absence.

**308. Electrical Machinery. (3-3)*. Credit 4*. I, II, S**

A study of the principal types of electrical machines, including their characteristics, applications, and control devices.

The practice includes actual operation and testing of electrical machinery and equipment most commonly used in industry. Prerequisite: Electrical Engineering 307.

**315. Alternating Currents. (3-3). Credit 4. I, II, S** †

Introduction to electrical circuit analysis. Volt-ampere relations of circuit elements, simple transients, complex numbers, phasors and response of networks. Prerequisites: Electrical Engineering 201; Mathematics 307 or registration therein.

**322. Electric and Magnetic Fields. (3-0). Credit 3. II, S**

Application of vector analysis to the theory of electric and magnetic fields. Maxwell's equations are used to study the propagation and reflection of electromagnetic waves. Prerequisites: Electrical Engineering 315; Mathematics 308 or registration therein.

**323. Electrical Circuit Theory. (3-0). Credit 3. I, II**

General circuit analysis and theorems for lumped constant, passive circuits. Steady state and transient response is studied by classical methods and by the behavior of impedance and admittance functions in the complex frequency plane. Prerequisites: Electrical Engineering 214 or 315; registration in Mathematics 308.

**324. Electrical Circuit Theory. (3-0). Credit 3. II, S**

A continuation of the study of lumped constant passage circuits, including transform methods of analysis, two terminal pair networks and three-phase circuits. Prerequisites: Electrical Engineering 323; Mathematics 308.

**325. Electronics. (3-0). Credit 3. I, II**

An introduction to the theory of electron tubes and transistors. Thermionic, gaseous, light sensitive, and cathode ray tubes; solid state devices, rectifier circuits and amplifier equivalent circuits will be covered. Prerequisites: Electrical Engineering 214 or 315, registration in 323.

**326. Electronic Circuits. (3-0). Credit 3. II, S** †

A study of the basic circuits used in radio, television, and computers. An analytical study of modulators, demodulators, oscillators, and amplifiers. Prerequisites: Electrical Engineering 325, registration in 324.

**327. Electrical Laboratory. (1-3). Credit 2. I, II**

Studies of the precision and accuracy of measurement. Electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 323, 325 or registration therein.

**328. Electrical Laboratory. (1-3). Credit 2. II, S**

Studies of the precision and accuracy of measurement, electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 322, 324, 326 or registration in these courses.

**331. Theory and Application of Electron Tubes. (3-3). Credit 4. I, S** †

For students other than electrical engineering majors. A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. Prerequisite: Electrical Engineering 307.

**401. Electrical Machinery. (3-0). Credit 3. I** †

A graphical and mathematical study of electrical machines, including transformers. Prerequisites: Electrical Engineering 324, registration in 403; Mathematics 308.

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*Becomes (2-3). credit 3, effective February 1961.

**402. Electrical Machinery. (3-0). Credit 3. II** †

A continuation of the study of synchronous machines; asynchronous machines, polyphase and single phase motors; rectifiers and converters and control equipment. Prerequisites: Electrical Engineering 401, 403, registration in 404.

**403. Electrical Laboratory. (0-6). Credit 2. I**

A laboratory study of the electrical machines covered in Electrical Engineering 401. Prerequisites: Electrical Engineering 324, 328, registration in 401.

**404. Electrical Laboratory. (0-6). Credit 2. II** †

A continuation of the laboratory study of electrical machines covered in Electrical Engineering 401, 402. Prerequisites: Electrical Engineering 401, 403, registration in 402.

**406. Electric Power Distribution and Transmission. (2-2). Credit 3. II** †

Lectures and recitations on the transmission and distribution of power by electrical methods including symmetrical components. Detailed calculations of line constants, lightning phenomena, switching surges, and cost estimates of transmission and distribution systems. Prerequisite: Electrical Engineering 415.

**415. Transmission Networks. (2-2). Credit 3. I** †

An analytical study of the theory of transmission lines and impedance matching devices. Hyperbolic-function treatment is generalized to apply to power, electronic, and communication circuits. The laboratory will consist of group problems and demonstrations. Prerequisites: Electrical Engineering 324; Mathematics 308.

**420. Servomechanisms and Control Devices. (3-0). Credit 3. I** †

A general study of closed-loop control devices, including electrical, hydraulic, and mechanical systems. Prerequisites: Electrical Engineering 307 or 323; Mathematics 308.

**428. Communication Circuits. (2-3). Credit 3. I, II** †

A study of the engineering principles used in wire line communications, including telephone and telegraph systems, transmission theory, inductive interference, networks, filters, loading, repeater and carrier systems. Laboratory investigations include transmission measurements on artificial lines involving the use of vacuum tube measuring devices and impedance bridges. Prerequisite: Electrical Engineering 415 or registration therein.

**432. Economic Phases of Engineering. (3-0)*. Credit 3*. II**

Problems in the mathematics of finance, depreciation, engineering economy, accounting, distribution factors, and rates with particular reference to the electric power industry. Prerequisite: Electrical Engineering 401.

**441. Symmetrical Components of Polyphase Circuits. (3-0). Credit 3. II** †

The solution of current, voltages, and power flow during fault conditions on a power transmission system by the application of a method of symmetrical components. Prerequisite: Electrical Engineering 308 or 401.

**451. Applied Electromagnetic Theory. (3-0). Credit 3. I** †

Static boundary value problems; conformal transformation; the Schwarz transformation; rectangular harmonics; cylindrical harmonics; Bessel functions; mathematics of Bessel functions; spherical harmonics; Legendre polynomials; applications of Maxwell's equations to plane waves in dielectrics and conductors; Maxwell's equations applied to antennas; radiation; fields and power calculations; antenna impedances. Prerequisites: Electrical Engineering 322; Mathematics 308.

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*Becomes (2-0), credit 2 effective September 1961.

**452. Ultra High Frequency Techniques. (2-3). Credit 3. II** †

An introduction to the theory and practice of ultra high frequency radio wave generation, transmission, and radiation. Development of Maxwell's equations and their application to transmission of electrical energy in wave guides. Prerequisite: Electrical Engineering 326.

**454. Advanced Electronic Circuits. (3-3). Credit 4. II** †

A study of the electronic circuits used for pulsing, counting, computing, and regulating and as wide band amplifiers. Transistor and tube elements will be considered. The laboratory will consist of measurements on typical devices. Prerequisite: Electrical Engineering 326.

**456. Communication Theory. (3-0). Credit 3. II** †

Introduction to the processing and transmission of information with emphasis on the mathematics and block diagrams of systems. Includes elements of information theory, effects of signal-noise ratio, methods of modulation and demodulation. Prerequisite: Electrical Engineering 454 or registration therein.

**457. Principles of Electronic Computers. (3-3). Credit 4. I** †

Organization and internal operation of analog and digital computers; function integration, addition, multiplication, and generation; analog system simulation; switching networks; Boolean algebra applied to digital computer components; analysis and synthesis of sequential devices, digital computer memories, input and output devices; the arithmetic unit. Prerequisite: Electrical Engineering 326 or registration therein.

**481. Seminar. (0-2). Credit 1. I**

Written reports and oral presentations of selected topics from current literature in the various fields of electrical engineering. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of electrical engineering. Prerequisite: Second semester senior classification.

## FOR GRADUATES

**601.* Advanced Alternating Currents. (3-4). Credit 4. I**

Wave analysis; mechanical and electrical wave analyzers; non-linear circuits; multiple winding transformer theory; transient solution of general network. The study of transients with oscillographs.

**602.* Advanced Alternating Currents. (3-4). Credit 4. II**

Steady-state and transient solution of recurrent networks, operational calculus methods of solution of circuits with lumped and distributed constants, non-linear circuits.

**605. Linear Servomechanisms. (3-3). Credit 4. I**

A continuation of Electrical Engineering 420 to include advance topics which will extend the study of analytic methods as applied to linear systems and introduce concepts related to linear systems synthesis. Prerequisite: Electrical Engineering 420.

**606. Non-Linear Servomechanisms. (3-0). Credit 3. II**

A study of techniques available to analyze non-linear systems, discontinuous systems, and discrete data systems, and a study of associated synthesis procedures. Prerequisites: Electrical Engineering 605; Mathematics 617.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**607. Alternating Current Circuits and Machines. (3-4). Credit 4. I**
The study of transient conditions in electrical machines.

**611. Symmetrical Components Applied to Electrical Engineering. (3-4). Credit 4. II**
The solution of unbalanced electrical circuits by means of symmetrical components; the study and measurement of machine constants by means of the oscillograph.

**624. Electronic Circuits for Instrumentation and Computation. (3-3). Credit 4. II**
Theory, analysis, and design of the electronic circuits used in instrumentation and computation. AC amplifiers, operational amplifiers, "and" circuits, "or" circuits, and "gate" circuits are included. Problems of drift compensation in DC amplifiers and closed-loop stability in multi-stage amplifiers are treated in detail. Prerequisites: Electrical Engineering 326, 457.

**626. Introduction to Electron Tube Design. (4-0). Credit 4. I**
The motion of ions in electric and magnetic fields, electron emission, and conduction through gases are studied. The applications in mass spectrometry, electron optics, and electron tube design are considered.

**628.* Design of Active Networks. (4-0). Credit 4. I**
A study of regeneration and feedback theory with emphasis on circuit design methods suitable for treatment of these topics. Prerequisites: Electrical Engineering 601; Mathematics 601 or the equivalent.

**636. Network Synthesis. (4-0). Credit 4. II**
Synthesis of electrical networks having arbitrarily specified terminal characteristics. Studies include realizability conditions, realization of general two-terminal and four-terminal networks and approximation of network specifications. Prerequisites: Electrical Engineering 601; Mathematics 601.

**637. Wave Guides and Cavities. (3-0). Credit 3. I**
Application of Maxwell's equations to the solution of guided electromagnetic fields. Course includes studies in skin effect, parallel plane wave guides, rectangular wave guides, circular wave guides, cavities, and microwave networks. Prerequisite: Electrical Engineering 451.

**638. Antennas and Propagation. (3-0). Credit 3. II**
Application of Maxwell's equations to determine the electromagnetic fields of antennas. Course includes studies in radiation, directional arrays, impedance characteristics, aperture antennas, propagation in free space, and propagation through the ionosphere. Prerequisite: Electrical Engineering 451.

**642. Transistors. (3-3). Credit 4. I, S**
Theory of junction triodes; voltage, current, power and frequency limitations. Small signal parameters and equivalent circuits for transistors; analysis and design of circuits at both small and large signal levels. Prerequisite: Electrical Engineering 326.

**653. Electronic Computer Design. (3-3). Credit 4. I, S**
Special function generation and system simulation for analog solution of both linear and non-linear differential equations, simulation techniques applied to control systems; advanced study of digital adders, subtractors, accumulators, multipliers, and dividers; digital error-detection; digital control; design of general purpose and special purpose digital computers. Prerequisites: Electrical Engineering 457 and either Electrical Engineering 415, 419, or the equivalent.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**685. Problems. Credit 1 to 4 each semester. I, II**

Research problems of limited scope designed primarily to develop research technique.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation.

## Department of Engineering Drawing

Professor W. E. Street,
Professors S. M. Cleland, B. F. K. Mullins, J. P. Oliver, C. H. Ransdell;
Associate Professors W. F. Adams, B. A. Hardaway, P. M. Mason, L. E. Stark;
Assistant Professors N. B. Bardell, Jr., R. H. Davey, Jr.,
J. E. McGarrah*; Instructor J. H. Earle

**105. Engineering Drawing. (0-6). Credit 2. I, II, S**

Care and use of drawing instruments and equipment, vertical freehand lettering, engineering geometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

**106. Descriptive Geometry. (0-6). Credit 2. I, II, S**

Point, line, and plane relationships. Bearings and slopes of lines. Contours, cuts, and fills. Strike and dip. Successive auxiliary view problems. Revolution about an axis and true length diagrams. Developments and intersections. Prerequisite: Engineering Drawing 105.

**127. Industrial Freehand Sketching. (1-3). Credit 2. I, II**

Basic techniques of freehand drawing in line and tone; delineation of form, textures, materials, sketching, and industrial applications of freehand drawing.

**128. Methods of Industrial Reproduction. (0-2). Credit 1. I, II**

Basic techniques of reproduction processes for industrial use.

**209. Nomography. (2-0). Credit 2. II**

To teach the theory and construction of various types of graphs that are used in upper class engineering courses and in technical reports. Prerequisites: Engineering Drawing 105, 106; Mathematics 120 or the equivalent.

**221. Building Construction Drawing. (1-3). Credit 2. I**

Architectural details in frame and masonry construction; general drawings and techniques of presentation. (For students in industrial education.) Prerequisite: Engineering Drawing 105 or the equivalent.

### FOR GRADUATES

**601. Advanced Industrial Drawing. (2-3). Credit 3. I, S**

Problems pertinent to all industrial fields. Solutions involve projections, primary auxiliary views, successive auxiliary views, revolutions, flat pattern layouts, perspective, and shades and shadows. Use of drafting machines and other special drafting equipment. Appropriate for high school and college teachers. Prerequisite: Engineering Drawing 106 or equivalent.

**603. Advanced Machine Drawing. (1-6). Credit 3. II, S**

Conventional practices, dimensioning, fastenings, machine and pictorial sketching. Empirical design including problems of stuffing boxes, piping, shafting, gears, cams, ship and aircraft parts. Use of special drafting equipment such as drafting machine, section liner, proportional dividers, erasing machines, light table, and mechanical lettering guides. Methods of reproduction. Appropriate for high school and college teachers. Prerequisite: Engineering Drawing 106 or equivalent.

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*Resigned effective January 5, 1960.

**605. Spherical Projections.* (2-0). Credit 2. I, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Drawing 106 or the equivalent.

**606. Stereographic and Clinographic Projections.* (2-0). Credit 2. II, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Drawing 106 or the equivalent.

**607. Descriptive Geometry for Teachers.* (4-0). Credit 4. II, S**

Fundamental concepts of descriptive geometry. The design and organization of problems and teaching devices for college teachers. Prerequisite: Engineering Drawing 106 or the equivalent.

**611. Technical Illustration.* (3-3). Credit 4. I, S**

Axonometric projection including shading. Design and construction of display layouts. Commercial and technical illustrating. Prerequisite: Engineering Drawing 106 or the equivalent.

## Department of English

Professor S. S. Morgan,

Professors J. P. Abbott, J. Q. Anderson, R. H. Ballinger, F. E. Ekfelt, J. Q. Hays, E. D. Hedgcock, C. D. Laverty; Associate Professors A. L. Bennett, K. E. Elmquist, C. A. Greer, H. E. Hierth, H. L. Kidd, Jr., L. J. Martin, E. E. Stokes, Jr.; Assistant Professors R. W. Barzak, S. S. Cox, H. S. Creswell, E. P. Crittenden, J. D. Ebbs, C. K. Esten, R. W. Feragen, L. F. Hauer, M. A. Huggett, P. C. Hunter, Jr., J. S. Jernigan, W. B. Kadow, L. B. Keel, H. P. Kroitor, T. J. Mattern, J. F. Peirce, F. W. Powell, J. N. Shepperd, Victor Wiening; Instructors R. E. Cain**, G. E. Gott, A. E. Hopwood***, C. R. Humphrey, F. A. Rodewald, Allen Schrader

**100. English for Foreign Students. (3-0). Credit 3. II, S**

Fundamentals of speaking and writing in English for students whose native language is not English. Students entering the course are expected to have studied English and to be able to communicate in English. **No credit will be granted for the satisfactory completion of this course.** (See the entry for course 100 under the Department of Modern Languages.)

**103. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. Readings in modern prose (non-fiction). Emphasis on language study and the mechanics of writing. (Special sections are offered for students of high proficiency and low proficiency in writing.)

**104. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

**203. Introduction to Literature. (2-0) Credit 2. I, II, S**

Reading in three of the following types: plays, stories, novels, and poems, chiefly modern. Papers on the readings. Prerequisites: English 103, 104.

**207. Report Writing and Correspondence. (2-0). Credit 2. I, II**

The writing of technical reports and business letters. Prerequisites: English 103, 104.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of the Graduate School.

**On leave of absence.

***Resigned effective January 31, 1960.

**210. Introduction to Logical Discourse. (2-0). Credit 2. I, II, S**
The principles of reasoning and their application in reading and writing. Prerequisites: English 103, 104.

**212. Shakespeare. (3-0). Credit 3. I, II, S**
A study of the major plays of Shakespeare, with lectures on his life, his language, and his cultural environment. Prerequisites: English 103, 104.

**231. Survey of English Literature. (3-0). Credit 3. I, II, S**
A survey of the literature of England from Anglo-Saxon times to Dr. Samuel Johnson. Prerequisites: English 103, 104.

**232. Survey of English Literature. (3-0). Credit 3. II, S**
A survey of the literature of England from mid-eighteenth century to the twentieth century. Prerequisites: English 103, 104.

**301. Writing for Professional Men. (3-0). Credit 3. I, II, S**
Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program of English.

**309. The English Language. (3-0). Credit 3. I** †
Survey of the grammatical structure, vocabulary, and history of the English language, with brief discussion of related languages. Prerequisites: Two courses in sophomore English. (Offered in 1959-60 and in alternate years thereafter.)

**310. Phonetics and Pronunciation. (3-0). Credit 3. II** †
Introductory discussion of the nature of language and of language study. Detailed study of the formation of English sounds, of usage in pronunciation, and of phonetic and phonemic principles. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**315. Seventeenth Century Literature. (2-0). Credit 2. I, S**
A period course in English poetry and prose of the seventeenth century, not including Shakespeare. Prerequisites: Two courses in sophomore English.

**316. Eighteenth Century Literature. (2-0). Credit 2. I, S**
A period course in English poetry and prose of the eighteenth century. Prerequisites: Two courses in sophomore English.

**319. Report Writing. (1-0). Credit 1. I**
The preparation of technical reports in the form observed by the Petroleum Division of the A.I.M.E., the American Petroleum Institute, and the American Association of Geologists. Prerequisite: English 104.

**320. Selected Reading. (1-0). Credit 1. I, II**
The reading of five books. Objects: to teach students to read good books and to enjoy and understand good literature.

**321. Nineteenth Century Literature (Romantic). (3-0). Credit 3. I** †
A study of the intellectual tendencies of the nineteenth century as reflected in the poetry of Wordsworth, Coleridge, Byron, Shelley, Keats, and others. Prerequisites: Two courses in sophomore English.

**322. Nineteenth Century Literature (Victorian). (3-0). Credit 3. II** †
A continuation of the study in nineteenth century thought as reflected in the writings of Tennyson, Browning, Arnold, and other Victorians. Prerequisites: Two courses in sophomore English.

**325. Creative Writing. (2-0). Credit 2. I**

The writing of stories, one-act plays, essays, editorials, and feature articles. Limited to students who have made an average of C in the prerequisite courses. Prerequisites: Two courses in sophomore English.

**327. American Literature to 1870. (2-0). Credit 2. I** †

A study of American literature from the Colonial Period through the Civil War. Prerequisites: Two courses in sophomore English.

**328. American Literature from 1870 to 1920. (2-0). Credit 2. II** †

A study of American writing from Whitman and Mark Twain to Frost and Dreiser. Prerequisites: Two courses in sophomore English.

**334. Science in Literature. (3-0). Credit 3. II**

The main developments in the history of science as they are presented in the literature of the Western World. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**336. Life and Literature of the Southwest. (3-0). Credit 3. II**

A study of the culture of the Southwest as expressed in literature. Prerequisite: A course in sophomore English. (Offered in 1959-60 and in alternate years thereafter.)

**340. Modern Drama. (3-0). Credit 3. II, S** †

A study of representative plays (in translation) by such dramatists as Ibsen, Hauptmann, Rostand, and Pirandello on the Continent, and Pinero, Shaw, Synge, O'Neill, and Maxwell Anderson in England and America. Prerequisites: Two courses in sophomore English.

**350. Modern Literature. (3-0). Credit 3. I** †

British and American novelists, poets, and dramatists from about 1920 to the present, with lectures on the social and intellectual background. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**371. Great Books. (3-0). Credit 3. I, II, S**

Greek plays, Roman lives (from Plutarch), Dante's **Inferno,** Shakespeare's **King Lear,** a Russian novel, twenty English poems, a modern novel. Prerequisite: Completion of the sophomore program in English.

**372. Great Books. (3-0). Credit 3. II, S**

Offered in alternate semesters with English 371. Typical works: Homer's **Iliad,** Lucretius' **On the Nature of Things,** Chaucer's **The Canterbury Tales** (selected), Rabelais' **Gargantus and Pantagruel,** Marlowe's **Dr. Faustus,** Cervantes' **Don Quixote,** Goethe's **Faust** (Part 1), Dostoyevsky's **Crime and Punishment,** and James' **The Turn of the Screw.** Prerequisite: Completion of the sophomore program in English.

**375. Great American Writers. (2-0). Credit 2. II**

The most important works of five or six distinguished American writers of the nineteenth and twentieth centuries chosen from Emerson, Melville, Whitman, Twain, James, Glasgow, and Frost. Prerequisite: One course in sophomore English.

**381. Play Production. (2-3). Credit 3. I**

Production of plays from the point of view of the director, the actor, and the technician. Students will participate in at least two plays with some work in television. Prerequisite: Completion of the sophomore program in English.

**382. Stagecraft. (2-0). Credit 2. II**

Methods of staging plays—scene design and construction as well as stage lighting. Participation in plays scheduled. Prerequisite: Completion of the sophomore program in English.

**401. Public Speaking. (0-2). Credit 1. I, II, S**

Practice in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the sophomore program in English.

**403. Speaking for Professional Men. (1-2). Credit 2. I, II, S**

Speech training for technical students in their professional fields. Speeches of social and technical interest; group discussions; parliamentary procedure. Prerequisite: Completion of sophomore program in English.

**407. Speaking and Oral Interpretation. (1-2). Credit 2. II**

Speech training with special attention to the student's professional field and instruction and practice in the oral interpretation of literature, both prose and poetry. (Students may not receive credit for both English 403 and 407.) Prerequisite: Completion of sophomore program in English.

**428. The Novel in English. (3-0). Credit 3. I** †

A study of the novel in English in the eighteenth, nineteenth, and early twentieth centuries. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**461. Teaching of Language and Composition. (3-0). Credit 3. S** †

A study of administrative and teaching problems involved in high school and college courses in composition. The organization and presentation of courses designed to improve student writing; various points of view toward language study held by teachers and students of linguistics; papers written by students and graded and criticized by instructor; supervised practice in grading and criticizing of student writing; the organizing of the curriculum in English from the grades to college. The course is intended for students expecting to teach English, for teachers of other subjects, and for principals and superintendents confronted with problems of organizing and administering the English program. Prerequisite: Senior classification or approval of instructor.

**485. Problems. Credit 1 to 3. I, II, S** †

Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his overall knowledge of literature and the criticism of literature. There will be written reports on the readings and a semester examination. Prerequisite: Eighteen hours of English.

## Department of Entomology

Professor J. C. Gaines,
Professors V. A. Little, H. J. Reinhard; Associate Professors P. L. Adkisson,
J. R. Brazzel, L. W. Getzin, R. L. Hanna, D. R. King, M. A. Price,
N. M. Randolph; Assistant Professors H. R. Burke, H. A. Turney

**201. General Entomology. (2-2). Credit 3. I, II, S**

A study of the principal orders of insects; the relation of anatomy and physiology of insects to control methods; the principal insecticides and their uses; the development, habits, and economic importance of the more common insects with control methods for the injurious species.

**208. Veterinary Entomology. (2-3). Credit 3. II**

A study of insects and other arthropods that are parasitic upon domestic animals concerned in the transmission of diseases. Methods of eradication and control are emphasized. Prerequisite: Sophomore classification in preveterinary medicine.

**301. Systematic Entomology. (2-3). Credit 3. I** †

A systematic study of the orders and families of insects, and the distinguishing characteristics of representative species. The preparation of insect collection and the use of keys for identification are emphasized in practice. Prerequisite: Entomology 201 or equivalent.

**302. Systematic Entomology. (2-3). Credit 3. II** †

A continuation of Entomology 301, including orders and families of insects not included in Entomology 301. Prerequisite: Entomology 301.

**305. Insect Morphology. (2-3). Credit 3. I** †

General morphology of typical insects with special emphasis on those structures of particular importance in systematic and applied entomology. Prerequisite: Entomology 201 or equivalent.

**306. Insect Physiology. (2-3). Credit 3. II** †

Internal anatomy and principles of physiology as applied to insects. Prerequisite: Entomology 305.

**313. Biology of Insects. (2-3). Credit 3. I**

General biology and taxonomy of the classes of Arthropoda. Emphasis is placed on the orders and more important families of Hexapoda, their marks of identification, general biology, and their relations to other animals. The use of keys for the identification of insects and other arthropods is stressed in the laboratory. Prerequisite: Three hours of biological sciences.

**401. Principles of Insect Control. (2-3). Credit 3. I** †

A study of both applied and natural controls emphasizing the uses, practical application, the physical and chemical properties of the more important insecticides. Prerequisite: Entomology 201.

**402. Agricultural Pests. (2-3). Credit 3. II** †

The biology, habits, and control of insect pests of farm crops, livestock, homes, and industrial buildings. Prerequisite: Entomology 201.

**405. Fruit and Vegetable Insects. (2-2). Credit 3. II**

The life history, habits, and control of insect pests of fruit, nut, and truck crops; the value of parasites and orchard management is considered in control. Prerequisite: Entomology 201 or the equivalent.

**423. Comparative Anatomy of Arthropods. (2-3). Credit 3. I**

A detailed comparison of the digestion, respiration, circulation, excretion, and nervous system of arthropods and related animals. Taxonomic characters are also stressed. Prerequisite: Entomology 305 or equivalent.

**424. Insect Ecology. (2-3). Credit 3. II**

The effect of environmental factors upon the distribution, abundance, competition, and ecological succession of insects. Prerequisite: Entomology 302 or equivalent.

**481. Seminar. (1-0). Credit 1. I, II**

Report of original investigations, current literature, and special features. Required for entomology seniors and graduate students each semester.

**485. Problems. Credit 1 to 4. I, II, S**

Individual problems for beginners in research. Prerequisite: Entomology 302.

## FOR GRADUATES

**601, 602. Systematic Entomology. (3-3). Credit 4 each semester. I, II**

A taxonomic study of the orders, families, including genera and species, of the class Hexapoda; a study of the International Rules of Nomenclature. A special study of some particular group of insects is required in practice. Prerequisite: Entomology 302.

**607. Economic Entomology. (3-3). Credit 4. I, S**

This course is designed chiefly for workers in vocational agriculture and the Extension Service. It includes studies of agricultural pests, their biologies, economic importance as determined by making infestation records, and the use of control measures. Also, insecticides and methods of application are considered. Prerequisite: Approval of Head of Department.

**608. Economic Entomology. (3-3). Credit 4. II**

A detailed study of insect pests, including identification, distribution, principles and methods of natural, cultural, and chemical controls. Literature and research methods are also stressed. Prerequisite: Entomology 401 or 402.

**613, 614. Morphology. (3-3). Credit 4 each semester. I, II**

A detailed study of anatomical structures of insects. Prerequisite: Entomology 305.

**615. Insect Physiology. (3-3). Credit 4. I**

A study of the physiology of respiration, circulation, digestion, and excretion; the mechanical and chemical senses of insects are considered. Prerequisite: Entomology 306 or equivalent.

**617, 618. Medical Entomology. (3-3). Credit 4 each semester. I, II**

The taxonomy and biology of parasitic insects, ticks, mites and their role in the causation and transmission of diseases affecting man and domestic animals. Prerequisite: Entomology 208 or equivalent.

**619. Insect Toxicology. (3-3). Credit 4. II**

Chemical compounds which possess toxic properties; actions of poisons on insects; evaluation of insecticides in the laboratory and field; and mathematical analysis of data. Prerequisite: Entomology 615.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Entomological problems not pertaining to a thesis or dissertation are considered. Prerequisites: Graduate classification with major or minor in entomology; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research problems on taxonomy, life histories, biological control, ecology, and physiology of insects, and the toxicology of insecticides. Prerequisite: Graduate classification.

## Department of Floriculture and Landscape Architecture

Professor A. F. DeWerth;
Associate Professor D. V. Sweet; Assistant Professor R. E.
Odom; Instructors T. T. Brady, Jr., Fred Klatt, Jr.

### FLORICULTURE

**206. Ornamental Plants. (2-2). Credit 3. I**

This course is devoted to a detailed study of trees, shrubs, and vines; their identification, adaptation to environmental conditions, value and management in landscape plantings. Major consideration will be given in this course to woody deciduous plants. Prerequisite: Biology 102.

**207. Ornamental Plants. (2-2). Credit 3. II**

A continuation of Floriculture 206. Major consideration will be given to the narrow and broad-leaf evergreens. Prerequisite: Floriculture 206.

**221. Fundamentals of Floriculture. (1-3). Credit 2. I**

The position of the horticultural specialties in agriculture and the organization of the ornamental plant industries. Practice in the basic techniques used in the production and marketing of ornamental plants. Prerequisite: Biology 101.

**224. Principles of Floral Designing. (1-3). Credit 2. II**

The principles and practices involved in commercial floral designing and in arranging flowers for interior decoration.

**319. Exotic Plants. (1-3). Credit 2. I**

A detailed study of the rare and exotic ornamental plants of the tropic and subtropic zones of the world including their identification, use, and adaptation to modern living. Prerequisite: Biology 102.

**320. Garden Flowers. (1-3). Credit 2. II**

The identification and uses of annual and perennial ornamental plants and garden roses and their adaptation to the environment of the Southwest.

**325. Marketing of Ornamental Plants. (3-0). Credit 3. I**

The economic status of the horticultural specialties in the United States and Texas. The application of specialized market techniques to these products and the developments and problems involved in present-day marketing channels. Prerequisite: Economics 203.

**327. Management Techniques of Floriculture. (1-3). Credit 2. I**

A study of the specialized management practices involved in the operation of modern nurseries, greenhouses, and retail sales outlets devoted to the production and selling of ornamental plants.

**424. Propagation of Ornamental Plants. (2-2). Credit 3. II** †

Specialized study of plant propagation with emphasis on the physiological and anatomical considerations involved and the importance of their application to the commercial propagation of ornamental plants. Prerequisite: Plant Physiology and Pathology 313.

**429. Greenhouse Crop Production. (3-3). Credit 4. I** †

The application of scientific developments to the principles and practices involved in the production, harvesting, and grading of crops grown in greenhouses and other forcing structures. Prerequisites: Plant Physiology and Pathology 301, 313.

**430. Nursery Crop Production. (3-3). Credit 4. I** †

The application of scientific developments to the principles and practices involved in the production, harvesting, and grading of plants grown in the modern nursery. Prerequisites: Plant Physiology and Pathology 301, 313.

**485. Special Problems. Credit 1 to 4. I, II**

Special problems in floricultural production, marketing, or landscape architecture. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**609, 610. Experimental Floriculture. (1-6). Credit 3 each semester. I, II**

Specialized study of the genera, species, varieties and clons of woody and herbaceous ornamental plants, including form, structure, identification, and adaptability to environmental conditions and climatic variations in the Southwest. Water, temperature, light, and soil relations of ornamental plants and their modification by management practices. Specific problems of management will be studied under field and greenhouse conditions.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

This course is for students who desire to work out special problems. Students will elect work in their desired subjects after a conference with instructor in charge. Prerequisites: Genetics 301; Plant Physiology and Pathology 301, 313; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## LANDSCAPE ARCHITECTURE

**201. History of Landscape Design. (2-0). Credit 2. II**

A study of the art of landscape design from the earliest efforts to the present day. Lectures, reference reading, library sketches, and reports.

**300. Summer Practice. Ten weeks, required. No credit. S**

Approved summer practice with a recognized landscape architect or nursery.

**301. Introductory Landscape Design. (1-6). Credit 3. I**

Delineation of landscape forms; drafting, lettering and introductory composition, analysis and solution of typical site problems. Prerequisites: Architecture 102; Floriculture 207.

**302. Landscape Design and Construction. (1-6). Credit 3. II**

Topographical studies, grading problems, construction of steps, walks and other garden structures, specifications and working drawings. Prerequisites: Civil Engineering 208; Floriculture 207.

**305. Planting Design. (1-3). Credit 2. I**

The use of plant materials in the composition of landscape design. Study of the mass form and texture of plant materials in relation to one another as well as to structures and site development. Plans, sketches, and models. Prerequisite: Landscape Architecture 302.

**407. Landscape Maintenance. (1-3). Credit 2. I**

Principles of pruning, soil preparation, planting and transplanting practices, arboriculture, and pest control. Prerequisite: Floriculture 207.

**408. Park Management. (2-0). Credit 2. II**

A study of the history, location, administration, and maintenance of public parks, and present trends in the field of recreation as it pertains to these areas.

**409. Intermediate Landscape Design. (1-6). Credit 3. I**

Specific problems in the design of residential homesites, parks and general public areas. Plans, sketches, and models.

**410. Advanced Landscape Design. (1-6). Credit 3. II**

Design of public and semi-public properties, school sites, golf courses, parks, and cemeteries. Prerequisite: Landscape Architecture 405.

**411. Landscape Design for the Architect and Engineer. (2-2). Credit 3. I**

Designed to present the principles of, and technical requirements involved in the landscape development of residential, industrial, and other outdoor areas. Special emphasis is placed on the relationship of the architectural and engineering professions to such developments. Not open to students majoring in landscape architecture.

## Department of Genetics

Professor C. B. Godbey,
Professors T. C. Cartwright, R. G. Reeves; Assistant Professors
J. E. Endrizzi, N. A. McNeil, J. D. Smith

**301. Genetics. (3-2). Credit 4. I, II, S** †

Fundamental principles of genetics: variation, heredity, the physical basis of Mendelian inheritance, the expression and interaction of genes, linkage, sex linkage, and mutation. Laboratory includes demonstrations of Mendelain ratios with Drosophila and an introduction to biometrical methods. Prerequisite: Biology 101 or 107.

**304. Plant Breeding. (3-2). Credit 4. II** †

The improvement of crops by hybridization and selection. Special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated, and asexually reproduced plants. Prerequisite: Genetics 301.

**306. Animal Breeding. (2-2). Credit 3. I, II** †

Genetics as applied to the problems of the animal breeder. Genetic and phenotypic effects of selection. Comparison of various selection methods such as mass selection, family selection, progeny and sib testing. Selection indexes. Systems of mating such as grading, cross-breeding, inbreeding, linebreeding, outbreeding, and random mating. Genetic analysis of pedigrees. Prerequisite: Genetics 301.

**406. Biometry—Experimental Technique. (2-3). Credit 3. I, II, S** †

A study of the binomial distribution and application; chi-square analysis; central tendencies; measures of dispersion; elementary sampling and sampling distributions; tests of hypotheses; measures of relationship; analysis of variance. Prerequisite: Mathematics 101.

**Poultry Science 414. Poultry Breeding. (2-2). Credit 3. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**603. Genetics. (3-0). Credit 3. I**

Advanced study of genetics with special attention focused on the evidence supporting the principles of heredity. Historical development of Mendelian genetics and the chromosome theory of heredity, statistical treatment of qualitative genetics, detection and measurement of linkage, extra nuclear inheritance, mutation and position effect, introduction to biochemical and developmental genetics. Prerequisites: Genetics 301; approval of the instructor.

**604. Genetics Laboratory. (0-3). Credit 1. I**

Inheritance studies principally with Drosophila including laboratory techniques and methods. Arranged to complement Genetics 603 and required for genetics majors.

**605. Biometry. (3-3). Credit 4. I**

Analysis of variance, covariance analysis, multiple regression, introduction to experimental designs. Prerequisite: Genetics 406.

**606. Biometry. (3-3). Credit 4. II**

Methods of constructing and analyzing designs for experimental investigations. Simple and partial confounded factorial designs; treatment of missing data. Prerequisites: Genetics 406, 605.

**612. Plant Genetics. (3-3). Credit 4. II**

Specialized study of genetics as related to plant breeding. Emphasis is placed on quantitative inheritance, heterosis, selection, ploidy, reproductive systems and the processing of quantitative data. Prerequisites: Genetics 304, 406, 603.

**616. Animal Genetics. (3-3). Credit 4. II**

The specialized study of animal genetics and population genetics especially as related to the improvement of herds, flocks or other groups within a species. Emphasis is placed on causes of change in gene frequency, methods of selection, systems of mating and heterosis; the inter-relationship among these forces and their measurement. Prerequisites: Genetics 306, 406, 603.

**620. Cytogenetics. (3-3). Credit 4. II**

A study of correlated genetical and cytological phenomena. Prerequisites: Biology 615; Genetics 301.

**623. Special Topics in Genetics. Credit 2 to 4. I**

Content of this course will depend upon the interest of the students and the specialty of the instructor. Lecturers who have attained distinction in genetics or related fields will conduct this course.

**625. Speciation. (2-0). Credit 2. I**

A study of the genetic and environmental forces which operate in species formation together with a critical examination and comparison of the more important current explanations of speciation. Prerequisites: Biology 349; Genetics 301.

**628. Animal Breeding. (2-0). Credit 2. I**

A course designed to acquaint the student with the current status of knowledge in the field of animal breeding through a critical survey of the literature. Emphasis is given papers dealing with problems of breeding for quantitative traits of economic importance in farm animals including beef cattle, dairy cattle, poultry, sheep, and swine. Considerable attention is focused on methods which have been used or are available for use in studying animal breeding problems. Prerequisite: Genetics 616.

**631. Biochemical Genetics. (2-0). Credit 2. I**

A study of the genetic control of cellular metabolism and a theoretical consideration of the mechanism of gene action. A consideration of nutrition and the genetic capacity for biosynthesis, gene-enzyme relationships, pleiotropism, plasmagenes, and the chemical nature of the agents of heredity. Prerequisites: Biochemistry and Nutrition 410 or Chemistry 227; Genetics 301.

**633. Forest Genetics. (3-0). Credit 3. I**

Specialized study of genetics as applied to forest trees; forest genetics, forest tree improvement and forest tree breeding, with emphasis on genetics of conifers, especially pines. Fundamental and applied phases are included. Prerequisites: Genetics 603; approval of the instructor.

**634. Forest Genetics Laboratory. (0-6). Credit 2. II**

Methods and techniques in forest genetics, forest tree breeding; crossing, grafting, air layering, field layouts, seed handling, greenhouse techniques. Prerequisite: Genetics 633.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Technical research problems subject to approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Prerequisite: Genetics 603.

**Poultry Science 613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

See Department of Poultry Science for a full description of this course.

## Department of Geography

Professor G. W. Schlesselman;
Instructor J. R. Howard

**201. Principles of Geography. (3-0). Credit 3. I, II, S**

The study of human society in relation to the physical conditions and natural resources of the earth. This course should make clear such factors of the natural environment as location, climate, relief, soils, surface and underground water, minerals and forests, with emphasis on the human response to these factors.

**203. Physical Geography. (3-3). Credit 4. I, II**

This course consists of a systematic description and interpretation of the distribution patterns and the regional associations of natural phenomena on the face of the earth.

**204. Economic Geography. (3-0). Credit 3. I, II**

A study of the commercial regions of the world, dealing with the production types or occupations, such as grazing, plantation farming, grain farming, fishing, lumbering, mining, and manufacturing.

**302. Geography of Europe. (3-0). Credit 3. II**

A geographical survey of Europe as a whole and of the individual countries.

**303. Geography of South America. (3-0). Credit 3. I**

Investigations of trade opportunities in South America. The economic activities of the major geographic regions as reflecting the present day utilization of the natural resources. Possibilities of future development.

**304. Geography of Asia. (3-0). Credit 3. II**

A general study of the continent of Asia and a more detailed study of selected regions.

**306. Meteorology. (3-0). Credit 3. I**

This course aims to present concisely and systematically the science of meteorology in its present state of development. The primary purpose is to set forth the facts and principles concerning the behavior and responses of the atmosphere.

**310. Climatology. (3-0). Credit 3. II**

A study of the nature and elements of climate and the factors that give rise to climatic differences and that determine the distribution of climatic types.

**312. Conservation of Natural Resources. (3-0). Credit 3. II**

A study of natural resources including ways and means of insuring wise utilization of essential or strategic resources.

**401. International Political Geography. (3-0). Credit 3. I** †

A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments.

### FOR GRADUATES

**601. Economic Geography. (4-0). Credit 4. I**

A regional survey of the world distribution of major agricultural and industrial commodities with particular attention to the causal action of natural, social, and economic factors. (Offered in 1959-60 and in alternate years thereafter.)

## Department of Geology and Geophysics

Professor S. A. Lynch,
Professors H. R. Blank, Peter Dehlinger, T. J. Parker, W. L. Russell,
F. E. Smith; Associate Professors K. J. Koenig, M. C. Schroeder,
C. L. Seward, Jr.; Assistant Professor J. M. Egar*

### GEOLOGY

**201. General Geology. (3-0). Credit 3. I, II**

The agents and processes that have produced the surface features of the earth and the structure of the earth's crust. Prerequisites: Chemistry 101 or equivalent; registration in Geology 203 or 207; registration in Geology 209 for majors in geology, geophysics, and geological engineering.

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*On leave of absence.

**203. Crystallography and Mineralogy. (2-6). Credit 4. I, II**

Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chemistry 102; Engineering Drawing 106; Mathematics 102, 103.

**204. Mineralogy and Rock Study. (1-3). Credit 2. II, S**

Continuation of Geology 203. Recognition and classification of common rocks by their megascopic characteristics. Prerequisites: Chemistry 207 or registration therein; Geology 203.

**205. Elementary Geology. (3-3). Credit 4. I, II**

General principles of physical geology, physiography, geologic processes, and an introduction to historical geology. Laboratory work on common minerals, rocks, and maps. Elective for arts and science students.

**207. Mineralogy and Rock Study. (2-6). Credit 4. I, II**

Practical hand specimen determination of common minerals and rocks by means of their physical properties. Study of well cuttings and cores. This course should be taken simultaneously with Geology 201. A course designed for petroleum engineers and not available to geology majors. Cannot be substituted for Geology 203. Prerequisites: Chemistry 102; Mathematics 103 or the equivalent.

**209. Introduction to Field Work. (0-3). Credit 1. I, II**

One-half day each week studying geologic processes. Scientific methods of field work are stressed. Should be taken concurrently with Geology 201 and cannot be taken for credit after credit is received for Geology 210.

**210. Historical Geology. (3-3). Credit 4. II, S**

Principles of stratigraphy and paleontology, the physical and organic record of the earth's history, hypotheses of the earth's origin. Prerequisites: Chemistry 102; Engineering Drawing 106; Geology 201 and 203, or 201 and 207, or 205 and approval of Head of Department; Mathematics 102, 103.

**299. Field Geology. Credit 2. Intersession**

Geological observations and mapping in an area exhibiting diversity of rock types, structures, and physiography. Prerequisites: Geology 201; approval of Head of Department.

**300. Field Geology. Credit 6. S**

Geologic mapping in selected areas in the Llano Uplift and the Marathon Basin. Written report. Prerequisites: Civil Engineering 208; Geology 204, 305, 306, 312.

**303. Petrography and Petrology. (2-3). Credit 3. I** †

Principles of optical mineralogy; identification of minerals in fragments and thin sections by use of the petrographic microscope; thin section study of igneous rocks, and their classification. Prerequisites: Chemistry 207; Geology 204.

**304. Sedimentary Petrography. (2-3). Credit 3. II** †

Microscopic study of sedimentary and metamorphic rocks in thin sections; heavy mineral analysis; description, origin, and classification of sedimentary and metamorphic rocks. Prerequisite: Geology 303.

**305. Invertebrate Paleontology. (3-3). Credit 4. I**

The morphology, classification, and geologic range of the principal invertebrate groups. Prerequisite: Geology 210.

**306. Stratigraphy. (3-3). Credit 4. II**

Stratigraphic studies of the United States with emphasis on the Gulf Coastal Plain formations and their correlation by means of invertebrate fossils. Laboratory studies consist of stratigraphic principles and the changing faunas through geologic time. Prerequisite: Geology 305.

**309. Agricultural Geology. (3-3). Credit 4. II**

Erosion, transportation, and deposition by water, wind, and ice. Chemical and physical processes of development and destruction of soils. Origin, development, and interpretation of surface features of the earth. Elements of earth structure and geologic history. Earthquakes, volcanoes, and mountains. Laboratory work in determination of rock-making minerals and common rocks and interpretation of topographic and geologic maps.

**312. Structural Geology. (2-3). Credit 3. II**

The interpretation of rock structures, their relation to stratigraphic, physiographic, and economic problems. Prerequisites: Geology 201, 204 or 207, 210.

**315. Principles of Sedimentation. (2-3). Credit 3. I**

Factors of environment, production, transportation, and deposition of sediments; products resulting from the operation of sedimentary processes; structures, textures, and colors of sediments. Laboratory work in collecting and sampling, mechanical analysis, methods of analyzing and presenting data. Prerequisites: Chemistry 207; Geology 201, 203, 204, 210.

**320. Geology for Civil Engineers. (2-3). Credit 3. I, II**

Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundations, and excavation. Prerequisite: Sophomore classification in civil engineering.

**399. Field Geology of the Gulf Coast Tertiary. Credit 6. S**

Mapping, stratigraphy, and structure in the Tertiary of the Gulf Coast area. Given as a summer field camp. May be used to substitute for Geology 433 and 4 hours of technical elective. Prerequisite: Geology 300.

**404. Geology of Petroleum. (2-3). Credit 3. I**

Origin, migration, and accumulation of petroleum. Typical United States oil and gas fields. Laboratory work in subsurface geology. Prerequisites: Geology 300, 306, 312.

**406. Economic Geology. (3-0). Credit 3. I** †

The application of principles of geology, chemistry, and physics to the formation of useful minerals and rocks and a general survey of such deposits. Prerequisites: Chemistry 344; Geology 300, 306, 312.

**409. Geology of Non-Metallics Other than Petroleum. (3-0). Credit 3. II** †

The mineralogy, stratigraphic, and structural relations, origin, geographic distribution, uses, and economics of non-metallic mineral deposits other than petroleum. Prerequisites: Chemistry 344; Geology 300, 306, 312.

**422. Natural Structural Materials. (2-3). Credit 3. II**

Building stones and stone products, with special emphasis on clays and clay products, their qualities, occurrences, uses, and processes of fabrication and manufacture. For students registered in architecture or engineering. Prerequisite: Junior classification.

**423. Micropaleontology. (1-6). Credit 3. II** †

A systematic survey of the important groups of micro-fauna with particular emphasis on their classification and use. Prerequisite: Geology 305.

**425. Subsurface Geology. (2-3). Credit 3. II** †

Study of well cuttings and cores; electrical, radioactive, drilling time, and caliper logs. Preparation of subsurface contour maps and cross sections. Prerequisites: Geology 300, 404; approval of Head of Department.

**431. Geomorphology. (2-3). Credit 3. I**

Principles and fundamentals of geomorphology. Laboratory work in advanced map interpretation. Prerequisites: Geology 300, 306, 312.

**433. Field Geology. (0-6). Credit 2. II** †

Two full afternoons per week devoted to the acquirement of techniques of field geology in areas adjacent to the campus. Prerequisites: Geology 300, 306.

**437. Cenozoic Micropaleontology. (1-6). Credit 3. I** †

Cenozoic micro-fauna of the Gulf Coast Province with emphasis on subsurface correlation. Prerequisite: Geology 423.

**441. Advanced Engineering Geology. (3-3). Credit 4. I** †

A survey of those phases of mineralogy, petrology, historical geology, structural geology, and sedimentation that may be applied to engineering problems. Not available to geology or petroleum engineering majors. Prerequisites: Senior classification; approval of Head of Department.

**443. Paleontology. (2-3). Credit 3. II**

Advanced invertebrate paleontology—megafossils. Prerequisite: Geology 305.

**481. Seminar. (1-0). Credit 1. I**

Review of current literature and technical developments. Discussion of certain legal aspects of the petroleum industry. Each student will make both oral and written reports. Prerequisites: Geology 300, 306, 312.

**482. Seminar. (1-0). Credit 1. II**

Continuation of Geology 481. Each student will prepare more advanced reports. Prerequisites: Geology 300, 306, 312.

**485. Problems. Credit 1 to 3. I, II, S**

Advanced problems in geology.

## FOR GRADUATES

**600. Earth Science for Secondary School Teachers. (2-3). Credit 3. S**

Survey of the fundamental principles of physical geology, geologic processes, and earth history including the origin and nature of the solar system. Designed to aid secondary school instructors in presenting earth sciences. Prerequisites: Graduate classification; approval of Head of Department.

**601. Advanced Research Techniques. (1-0). Credit 1. II**

An introduction to modern instrumentation techniques and methods used in geology. Prerequisite: Graduate classification.

**609. Field Geology. Credit 2 to 6. I, II, S**

Systematic geologic surveying of selected areas. Prerequisite: Geology 300.

**612. Structural Geology. (3-0). Credit 3. I**

A detailed study of geologic structures and a consideration of theories regarding earth movements, with selected readings. Prerequisite: Geology 312.

**616. Micropaleontology. (1-6). Credit 3. I**

Study of microscopic fossils and their uses in correlation. Laboratory work in the examination of well samples. Prerequisite: Geology 423.

**618. Sedimentation. (3-0). Credit 3. II**

Investigation of processes of sedimentation with analytical laboratory work on sedimentary rocks. Seminar. Prerequisite: Geology 315.

**619. Petroleum Geology. (3-0). Credit 3. II**

A theoretical study of some of the problems in petroleum geology. Prerequisite: Geology 404.

**620. Geology of Ground Water. (3-0). Credit 3. I**

Principles of occurrence and movement of water beneath the earth's surface, and the influence of various geologic situations upon its behavior. Factors applying to estimates of supply. Engineering aspects of ground water.

**622. Stratigraphy. (3-0). Credit 3. I**

Sources and depositional environment of sediments, character and relation of sedimentary strata, and the principles involved in delimiting, correlating, and naming stratigraphic units.

**625. Advanced Ground Water Geology. (3-0). Credit 3. II**

Seminar course in the application of the principles of advanced geology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent; approval of Head of Department.

**627. Continental Evolution Outside of North America. (2-0). Credit 2. II**

A reading and conference course on the available literature, dealing with the basic geology of areas outside of North America in which industries and governments are asking for the services of American geologists. Designed for students contemplating foreign service. Areas to be studied will be suited to individual needs.

**629. Structural Framework of North America. (3-0). Credit 3. II**

Description of the important geologic structures of North America and of the development of regional structural features in geological times. Prerequisite: Graduate classification.

**631. Geology in Engineering Construction. (3-0). Credit 3. II**

Geologic principles applied to the construction of highways, foundations, bridge abutments and piers, tunnels, dams, reservoirs, etc. Construction materials. Test borings and their interpretation. Prerequisites: Graduate classification; approval of instructor.

**639. Paleozoic and Mesozoic Paleontology. (3-0). Credit 3. I**

Study of the important faunas of these eras. Prerequisites: Graduate classification; approval of Head of Department.

**640. Cenozoic Paleontology. (3-0). Credit 3. II**

Study of the important faunas of this era with emphasis on the megafossils of the Gulf Coast. Prerequisites: Graduate classification; approval of Head of Department.

**643. Paleozoic Stratigraphy. (3-0). Credit 3. II**

Stratigraphy of the Paleozoic System with particular emphasis on the Paleozoic of West Texas and Oklahoma. Prerequisites: Graduate classification; approval of Head of Department.

**644. Mesozoic Stratigraphy. (3-0). Credit 3. II**

Study of the stratigraphy of the Mesozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**645. Cenozoic Stratigraphy. (3-0). Credit 3. II**

Study of the Cenozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**646. Gulf Coast Stratigraphy. (3-0). Credit 3. II**

Detailed study of the Mesozoic and Cenozoic Systems of the Gulf Embayment. Prerequisites: Graduate classification; approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geology to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geological problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geology. Research for thesis or dissertation.

## GEOPHYSICS

**435. Principles of Geophysical Exploration. (3-3). Credit 4. I** †

Principles of the different methods used in geophysical exploration with emphasis on the interpretation of geophysical data and physical properties of rocks. Prerequisites: Geology 312; Mathematics 210; Physics 219; approval of Head of Department for majors in other departments.

**436. Seismic Exploration. (2-3). Credit 3. II** †

Study of seismic investigations with artificial sources, including field procedures, instrumentation, and interpretation of data. Prerequisite: Geophysics 435.

**446. Physics of the Earth. (3-0). Credit 3. II** †

A study of the earth's elastic and inelastic behavior, its gravitational, magnetic, electrical and thermal fields, the effect of forces acting within the earth, and implications of these factors during geologic time. Prerequisites: Geology 312; Mathematics 210; Physics 219; approval of Head of Department for majors in other departments.

**485. Problems. Credit 1 to 3. I, II, S** †

Advanced problems in geophysics.

### FOR GRADUATES

**651. Theoretical Seismology. (3-0). Credit 3. I**

Mathematical development of elasticity theory and stress waves in bounded and unbounded solid media. Prerequisites: Geophysics 435 or registration therein; Mathematics 308 or registration therein.

**653. Gravity and Magnetic Methods. (3-0). Credit 3. II**

Study of the earth's gravity and magnetic fields; the role of gravity in geodesy; methods, instruments, and interpretation of data in gravity and magnetic methods of exploration. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**655. Electrical and Radioactivity Methods. (2-0). Credit 2. II**

Study of procedures, instruments, and interpretation of data obtained from electrical, electromagnetic, and radioactivity methods of exploration. Minor emphasis is on geothermal and geochemical methods. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**657. Earthquake Seismology. (2-0). Credit 2. I**

Study of earthquakes, their causes, effects, method of location, determination of wave paths, interpretation of deep structures; and instruments used for recording. Prerequisites: Geophysics 435, 651 or registration therein.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geophysics to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geophysical problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geophysics. Research for thesis or dissertation.

# Department of Health and Physical Education

Professor C. E. Tishler,
Professors A. D. Adamson, W. M. Dowell, C. W. Landiss, W. L. Penberthy,
H. B. Segrest; Associate Professors P. M. Andrews, Emil Mamaliga,
N. A. Ponthieux; Assistant Professors L. A. Harrison, Jr.,
L. L. Palmer; Instructors H. H. Walton, R. K. Wieder

## HEALTH EDUCATION

**216. First Aid. (0-3). Credit 1. I, II, S**

Prepares students for Red Cross Standard, Advanced, and Instructor's First Aid Certificates.

**218. Athletic Injuries. (1-3). Credit 2. II**

A study of the conditioning and training of the individual and team; care and prevention of injuries. Prerequisites: Biology 219; Health Education 216.

**415. Secondary School Health Education. (3-0). Credit 3. I, S** †

A study of health problems; needs of the individual; cooperation of home and community; resources for health in community, state, and nation; techniques of evaluation. Prerequisites: Biology 225; approval of instructor.

**421. Elementary School Health Education. (3-0). Credit 3. II** †

A study of modern trends and methods in the elementary school health program; survey of materials and agencies and their value to an adequate health program. Prerequisites: Biology 225; approval of instructor.

## FOR GRADUATES

**631. Community and Public Health. (3-0). Credit 3. S**

A study of community health problems and of public health measures to solve them. Typical organizations and specific functions of state and local health departments; relationship of local health department to state and federal health agencies and programs. Prerequisite: Health Education 415 or 421. (Offered in 1959-60 and in alternate years thereafter.)

## PHYSICAL EDUCATION

Physical Education 101, 102, 201, and 202 are required in all curricula. Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be required to register for general conditioning activities. All others may elect to register for one of the following activities: badminton, bowling, boxing, conditioning, diving, fencing, golf, gymnastics, handball, life saving, swimming, tennis, volleyball, water polo, weight training, or wrestling. The purpose of these courses is to teach the student through instruction and practice the fundamental knowledge and skills of at least two activities in which he will be able to participate in adult life. No student will be permitted to repeat an activity unless he has failed it.

Students may elect Physical Education 301, 302 for credit of one hour each after having completed the required courses.

**101. Required Physical Education. (0-2). No credit. I, II**

**102. Required Physical Education. (0-2). No credit. I, II**

**201. Required Physical Education. (0-2). No credit. I, II**

**202. Required Physical Education. (0-2). No credit. I, II**

**210. Life Saving and Pool Management. (1-3). Credit 2. II**

Designed to qualify students for Red Cross Senior Life Saving and Instructor's certificates; includes a study of sanitary codes and pool sanitation, problems of pool and waterfront management; selection of personnel. Prerequisite: Advanced swimming. (Offered in 1960-61 and in alternate years thereafter.)

**211. Physical Education Activities. (1-3). Credit 2. I**

A basic course designed to provide instruction and development of skill in physical education activities.

**213. Introduction to Health and Physical Education. (3-0). Credit 3. I, II**

The approach, fundamental principles and application of principles; definition, traditions, developments, psychology, aims, objectives, and results of physical education; building a program of health and physical education. Prerequisites: Sophomore classification; approval of instructor.

**221. Safety Education. (2-0). Credit 2. I**

A study of the general program of safety education; accidents, preventive measures, traffic safety, safety at home, school, and work; visual aids, safety projects, special programs; utilization of agencies outside of school.

**226. Introduction to Recreation. (2-0). Credit 2. II**

A study of the nature, extent, significance, and history of recreation; leadership personnel, its function, training, and selection; planning recreation areas and facilities; program planning and activity organization.

**251. Coaching of Basketball. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in basketball.

**253. Coaching of Baseball. (1-3). Credit 2. II**

Teaching of individual techniques; position play; training; team offensive and defensive strategy. Prerequisites: Junior classification; approval of instructor. (Offered in 1959-60 and in alternate years thereafter.)

**255. Coaching of Track. (1-3). Credit 2. I**

Theory and practice of coaching fundamentals in track and field events.

**301. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**302. Physical Education. (0-3). Credit 1. I, II**

This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**315. Elementary School Physical Education. (3-0). Credit 3. II**

Organization of physical activities in public schools; methods in teaching games used in public school programs. Prerequisites: Junior classification; approval of instructor.

**316. Secondary School Physical Education. (3-0). Credit 3. I**

Class organization, control, and management; methods of presenting subject matter; special methods in activities. Prerequisites: Junior classification; approval of instructor.

**317. Coaching of Football. (1-3). Credit 2. II**

Teaching of fundamentals; individual techniques; training; offensive and defensive strategy; officiating.

**321. Coaching of Tennis. (1-3). Credit 2. I**

Analysis, theory and practice of tennis strokes; strategy; methods of coaching; organizing and conducting tournaments. Prerequisites: Junior classification; approval of the instructor. (Offered in 1959-60 and in alternate years thereafter.)

**325. Outdoor Activities. (2-0). Credit 2. II**

A course designed to acquaint the student with the function of the camp and outdoor activities as educational agencies through the medium of practical projects and activity, organization, problems, and modern programs in the various areas.

**331. Sports in American Culture. (3-0). Credit 3. I**

A study of the history and evolution of sports; the role and cultural implications of sports in American democracy; the Olympic games; sports and their function in American schools and colleges.

**423. Administration of Health and Physical Education. (3-0). Credit 3. II, S** †

Administrative problems involved in the coordination of the health, physical education, intramural, and athletic areas in a comprehensive program of physical education. Prerequisites: Biology 225; Health Education 415; Physical Education 213.

**425. Tests and Measurements. (3-0). Credit 3. I, II, S** †

Use, interpretation, evaluation, and administration of existing tests in health and physical education; application of elementary statistical procedures. Prerequisites: Health Education 415; senior classification.

**427. Remedial Exercises. (3-0). Credit 3. I**

Elementary techniques in diagnosing functional and structural defects; procedures of individual exercise with emphasis on preventive and remedial measures. Prerequisites: Biology 219, 220; approval of instructor.

**450. Directed Teaching. (2-12). Credit 6. I, II**

Construction of lesson plans, observation and supervised practice teaching in public schools. Prerequisites: Physical Education 316; senior classification.

**481. Seminar. (1-0). Credit 1. I, II, S**

General discussion of professional ethics and current problems relating to health, physical education, and athletics. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Survey of Research. (3-0). Credit 3. S**

A study of published reports and research in the field of health and physical education. Prerequisite: Education 426 or Physical Education 425.

**603. Coaching and Officiating. (3-0). Credit 3. S**

Advanced coaching and officiating techniques in football, basketball, track, and baseball. Prerequisites: Teaching and coaching experience.

**610. Administration of Interschool Athletics. (2-0). Credit 2. S**

This course is designed for school superintendents, principals, and athletic directors. A study of the University Interscholastic League rules and regulations and the various problems confronting the school administrator in administration of the interschool athletic program. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**614. Philosophy and Principles. (3-0). Credit 3. S**

Divergent origins, leaders, conditions, and forces affecting the development of health and physical education. Critical analysis of objectives. Principles of education, psychology, and physiology, and their implications in health and physical education. Prerequisite: General prerequisite for minor. (Offered in 1959-60 and in alternate years thereafter.)

**622. Supervision of Health and Physical Education. (3-0). Credit 3. S**

Methods and policies of the school supervisor; conferences, planning and presenting the program, evaluating results, improving teachers-in-service. Prerequisite: Physical Education 423. (Offered in 1960-61 and in alternate years thereafter.)

**636. Advanced Tests and Measurements. (3-0). Credit 3. S**

Critical study of tests and measurements available; methods of constructing and evaluating new tests and measurements. Prerequisite: Physical Education 425. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislative certification, professional ethics, and other current problems relating to health, physical education, and recreation. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Directed study of selected problems of health, physical education, and recreation not related to a thesis. Prerequisites: Graduate classification; approval of the instructor.

## Department of History and Government

Professor J. M. Nance,
Professors J. H. Bass, J. H. Hill*, A. B. Nelson; Associate Professors W. E. Benton, C. H. Hall, H. H. Lang, T. L. Miller, P. J. Woods; Assistant Professors G. E. Bayliss, W. S. Chumlea, J. T. Duncan, C. E. Frazier, Jr., R. L. Harris, J. C. Roberts, Jr., L. C. Taylor, Jr.; Instructors A. C. Ashcraft, M. T. Kyre, Jr., H. M. Monroe, Jr., S. I. Roberts, C. E. Wynes

### GOVERNMENT

**305. Government of the United States and Texas. (3-0). Credit 3. I**

The organization, functions, and nature of the national government; the rights and privileges of citizenship; the immigration and naturalization laws, all as closely related to the constitution as possible, are treated first. A similar treatment is then applied to the government of Texas. Open only to military juniors and seniors in agricultural education and industrial education.

**306. American National Government. (3-0). Credit 3. I, II, S**

The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible.

**307. State and Local Government. (3-0). Credit 3. I, II, S**

The nature, organization, and general principles of local government in the United States with especial attention to these forms of government in Texas. Prerequisite: Government 306 or its equivalent. Required as condition to degree of all students who have not had at least three semester hours credit in military training before graduation.

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*On leave of absence.

**308. United States Constitutional Development. (3-0). Credit 3. II**

A study of leading decisions of the Supreme Court. The various trends in our constitutional growth since 1789 are treated, as well as the expansion through judicial interpretation of the powers delegated to the national government. Some attention is given to legal terminology and to the composition and functioning of the national judiciary. Required of all pre-law students in three-year pre-law program. Prerequisites: Government 306; History 105.

**310. Comparative Government. (3-0). Credit 3. II**

A survey of major European governments. Stress will be placed upon the parliamentary democracies of Great Britain, France, West Germany, and Italy. The dictatorships of the U.S.S.R. and Spain will also be considered. Governmental background, structure, and operation will receive attention. Prerequisite: Junior classification. (To be offered in 1960-61 and in alternate years thereafter.)

**315. American Political Parties. (3-0). Credit 3. I**

A study of the organization, history, and functions of political parties, and the place they occupy in the operation of national, state, and local governments in the United States. Attention is concentrated on the two major political parties, but some attention is given third party movements. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**320. Elements of Political Thought. (3-0). Credit 3. II**

A study of ancient, medieval, and modern concepts of government as developed by the principal contemporary political writers, and as reflected in political institutions. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**335. Government and Politics of Latin America. (3-0). Credit 3. I**

The constitutional development, political institutions, and contemporary political problems of the principal Latin American countries, with special emphasis on the present day constitutions and government structure. Prerequisite: Six hours of government. (To be offered in 1961-62 and in alternate years thereafter.)

**436. Municipal Government. (3-0). Credit 3. I**

Designed for students who may enter the municipal service as well as for those who desire only a general knowledge of city government. Urban growth; legal position of cities; forms of government; the mayor, council, city manager, and municipal courts; relation of city to state; the political process; municipal ownership; services; metropolitan problem; special reference to Texas cities. Prerequisite: Government 305 or 306. (To be offered in 1960-61 and in alternate years thereafter.)

## HISTORY

**105. History of the United States. (3-0). Credit 3. I, II, S**

English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and the slavery problem; war for Southern independence. (See "Requirement in Government and History", page 54.)

**106. History of the United States. (3-0). Credit 3. I, II, S**

Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; World War I; reaction and the New Deal; World War II; contemporary America. Prerequisite: History 105.

**213. History of England. (3-0). Credit 3. I, II**

British, Saxon, and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament. Required in three-year pre-law program.

**214. History of England. (3-0). Credit 3. I, II**

Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the twentieth century; growth of the Empire until World War II. Required in three-year pre-law program. Prerequisite: History 213.

**217. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe in the Middle Ages. A survey of the development of European civilization from the decline of the Roman Empire to the Renaissance. The course is designed to give the student historical perspective as well as a basic historical knowledge of the period. Major topics include the Graeco-Roman heritage, the barbarian migrations, the growth and development of the church, the rise of capitalism, medieval society, and the origin of nationalism in Europe. Required of majors in history.

**218. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe from the Renaissance to the present. A survey of modern European civilization, dealing especially with the Renaissance and the Reformation, the Age of Reason and the French Revolution, the Napoleonic wars, the growth of nationalism and democracy in the nineteenth century, the causes and consequences of the two world wars and the rise of dictatorship. Required of majors in history. Prerequisite: History 217.

**302. Colonization of North America. (3-0). Credit 3. II**

Geographic setting; early English, French, Dutch, Swedish discovery, conquest, and settlement, 1497-1763; colonial administration; colonial life; inter-colonial wars. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1960-61 and in alternate years thereafter.)

**313. The Latin-American Nations to 1820. (3-0). Credit 3. I** †

The period when the Americas south of the United States belonged to Spain and Portugal; discovery; colonial system; social and economic aspects; the wars of independence to the founding of the republics. (To be offered in 1960-61 and in alternate years thereafter.)

**314. The Latin-American Republics, 1820 to the Present. (3-0). Credit 3. II** †

The twenty Latin-American republics since 1820; independence and the dictators; rise of the ABC states; Latin-American civilization after a century of independence; relations with Europe and with the United States in Pan-American movement; participation in world affairs. (To be offered in 1960-61 and in alternate years thereafter.)

**315. The United States, 1901 to the Present. (3-0). Credit 3. I, II, S** †

A study of United States history during the twentieth century. Emphasis is placed primarily on the development and application of progressive principles from the "square deal" of the first Roosevelt to include the subsequent "new deal" and "fair deal" of the Roosevelt and Truman administrations; secondary emphasis is on the international relations of the United States as the nation became a world power, moved from isolation to leadership and back, followed by the development of the "good neighbor" policy toward Latin-America and our participation in World War II. The United Nations and problems.

**318. International Developments since 1918. (3-0). Credit 3. I, II, S** †

A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question, and the clash of United States-Japanese policies. World War II; the conflict of ideologies.

**325. Trends in American History. (3-0). Credit 3. I, II, S**

The sources and development of leading American institutions constituting representative democracy, their influence upon our nation's development and upon the twentieth century world. Course stresses the institutional rather than the chronological and political aspects of the United States, endeavoring to present what has been well styled "The Epic of America". Students who have credit for History 105 or 106 may not receive credit for History 325. Required of all students offering only three semester hours in American history toward the legal requirement for a baccalaureate degree. Prerequisite: Sophomore classification.

**326. History of Texas. (3-0). Credit 3. I, II, S**

A history of Texas from the Spanish period to the present day. Stress will be placed upon the period of Anglo-American settlement, the revolution, the republic, and the development of the modern state. Prerequisite: Sophomore classification.

**331. Medieval Civilization. (3-0). Credit 3. I**

History of medieval thought ranging from the influence of Plato and Aristotle to the age of Erasmus and Machiavelli. The course outlines the intellectual history of the Middle Ages and includes in broad outline the interests of man in philosophy, science, education, law, and religion. Prerequisite: Six semester hours of history.

**332. Renaissance and Reformation. (3-0). Credit 3. II**

A study of the fifteenth and sixteenth centuries with emphasis upon the intellectual history of the era. Political ideas, art, and humanism of the Renaissance are stressed. The doctrinal controversy and the beliefs of Luther, Calvin, and Zwingli are emphasized in the Reformation. Prerequisite: Six semester hours of history.

**411. The Old South. (3-0). Credit 3. I, S** †

A history of the antebellum South. Emphasis will be placed on the following topics: physical bases of Southern regionalism; Southern alignments on national issues; the slavery-plantation economy and society of the Old South; secession and formation of the Confederacy. Prerequisite: History 106 or 325.

**412. Civil War and Reconstruction. (3-0). Credit 3. II**

Survey of the background and causes of the war; military, political, economic, and diplomatic aspects of the war; life behind the lines; reconstruction and post-war adjustments, 1861-1877. Prerequisite: Twelve hours of history, or six hours of history and six hours in sophomore courses in other social sciences. (To be offered in 1960-61 and in alternate years thereafter.)

**415. The Institutional Background of Texas, 1519-1845. (3-0). Credit 3. I, S** †

A study of the history of Texas from the Spanish period to annexation to the United States. Particular stress is placed upon the Spanish legal and administrative system. The Mexican administrative system, the establishment of Anglo-Americans in Texas, the revolution, the republic, and the fight for annexation. In each of these topics emphasis is placed upon principles and developments of this period which are reflected in the state's present-day society. (To be offered in 1961-62 and in alternate years thereafter.)

**416. Texas Since 1845. (3-0). Credit 3. II, S** †

A history of Texas since annexation. Careful attention is given to social, cultural, economic, and political developments, and to the place of Texas in national affairs. (To be offered in 1961-62 and in alternate years thereafter.)

**421. Far East, 1895 to Present. (3-0). Credit 3. II**

Brief survey of the government, politics, and civilizations of China, Japan, India, Pakistan, and Southeast Asia; the political picture in the Far East at the end of the Sino-Japanese War, 1895; spheres of influence; Boxer Rebellion; colonialism and nationalism; rise of republicanism; Far East in two world wars; international developments in the Far East; Korean War. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1961-62 and in alternate years thereafter.)

**422. International Rivalry in the Gulf-Caribbean Area, 1840 to the Present. (3-0). Credit 3. I** †

Background of Spanish colonial policy, with British, French, and Dutch intrusion; conflict of interests; influence of islands on mainland settlement. Early United States interest; Monroe Doctrine and its extension; vital treaties with Colombia and Great Britain. European interests in the islands, Central America, Mexico, and Venezuela. Later policies of the United States, rise of Pan-Americanism and Pan-Hispanism. First recripocal trade treaties and rise of United States imperialism. Policy of "the good neighbor" under Wilson and Roosevelt. Recent progress of Pan-Americanism toward western hemisphere solidarity. (To be offered in 1961-62 and in alternate years thereafter.)

**423. American Foreign Relations. (3-0). Credit 3. I, S** †

The history of the United States foreign relations and development of our leading foreign policies to 1868. The Revolution and alliance with France; the development of isolation and neutrality; neutral rights and the War of 1812; nationalism and the Monroe Doctrine; Manifest Destiny and its consequences; diplomacy of the Civil War; the Monroe Doctrine applied to France in Mexico; the "Alabama" claims arbitration. (To be offered in 1960-61 and in alternate years thereafter.)

**424. American Foreign Relations. (3-0). Credit 3. II, S** †

The history of the United States foreign relations and development of our leading foreign policies, 1875 to the present; America becomes a world power; imperialism; World War I and the failure of neutrality; the League of Nations and its desertion; Pan-Americanism; failure of disarmament and rise of aggression; neutrality fails again; World War II; United Nations and problems. (To be offered in 1960-61 and in alternate years thereafter.)

## FOR GRADUATES

**607. The United States, 1763-1800. (3-0). Credit 3. I**

A study of the causes of the American Revolution, the Revolution, the Articles of Confederation, and final union under the Constitution. Careful attention will be given economic and social developments as well as political developments. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1960-61 and in alternate years thereafter.)

**610. The Trans-Mississippi West. (3-0). Credit 3. II**

A study of the West in American history. The course will emphasize political, economic, social, and cultural influences of the frontier. Extensive reading will be required. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1960-61 and in alternate years thereafter.)

**612. The French Revolution and Napoleon. (3-0). Credit 3. II**

Detailed consideration of the decline of the ancient regime, the influence of the Encyclopedists, the causes and course of events during the revolution, and a study of the Napoleonic Era. Critical evaluation of the source material as well as interpretation of the historical importance of the period is stressed. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**615. Growth of Spanish Institutions in America, 1492-1857. (3-0). Credit 3. I**

A study of the growth of political, economic, religious, military, and related institutions, both in theory and in practice, as proposed, developed, and applied to the Spanish-American colonies and nations, 1492-1857. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual instruction in selected fields of history. The course will stress reports and wide reading in the field selected. Prerequisites: Eighteen hours of history and government; graduate classification.

## Department of Horticulture

Professor G. W. Adriance.
Professors H. T. Blackhurst, F. R. Brison; Associate Professors E. E. Burns, H. C. Mohr; Assistant Professors J. C. Finn, Jr., J. B. Story

**201. General Horticulture. (2-2). Credit 3. I, II**

A survey of the general field of horticulture; the growth and fruiting habits of horticultural plants; a study of the principles and practices of propagation, including seedage, cuttage, graftage, and special methods; a study of the planting, care, culture, harvesting, handling, and utilization of fruit and vegetable crops. Prerequisite: Biology 101.

**311. Processing Horticultural Crops. (2-3). Credit 3. I** †

A study of the principles and practices of canning, quick freezing, dehydration, pickling, and juice manufacture of fruits and vegetables. Fundamental concepts of the various techniques of preparation, processing, packaging, and use of additives will be given. Field trips to commercial processing plants will be made.

**319. Orchard Management. (2-2). Credit 3. II**

Study of orchard practices including soils and sites, planting, cultivation, pruning, spraying, harvesting, temperature relations, water relations, and selection of varieties. Prerequisite: Horticulture 201.

**322. Vegetable Crops Management. (2-3). Credit 3. I**

The principles of vegetable crop production will be covered. The factors of climate, soil, crop rotation, variety, plant growing, transplanting, planting, irrigation and drainage, weed control, insect and disease control, harvesting, marketing, storage, and special cultural practices will be considered. All of the major vegetable crops will be discussed with reference to these factors.

**418. Nut Culture. (1-3). Credit 2. II** †

Importance of nut crops, emphasis on pecan; problems of developing and maintaining pecan groves; developing native trees; study of varieties, fruit setting, soils, fertilizers, propagation methods, harvesting, handling, shelling, storage, and marketing the crop. Practice: Budding and grafting nursery stock, topworking native trees, storage and handling of budwood, examination of soils, spray application, visits to shelling plants.

**422. Citrus and Subtropical Fruits. (2-2). Credit 3. I** †

A study of subtropical fruits, with attention to citrus fruits, figs, olives, avocados, and dates. Practice: Study of varieties of subtropical fruits and their products; propagation and care of the various subtropical fruits.

**426. Commercial Propagation. (2-2). Credit 3. II** †

A study of principles and practices followed in the propagation of fruit trees. The course includes a study of graft union, congeniality between stocks and scions, adaptation of stocks to environment, and commercial propagation practices for important fruits. Practice includes special treatments for seeds, budding, grafting, and transplanting for important fruits.

**434. Grading and Packing Vegetables. (2-2). Credit 3. I** †

A consideration of the factors of good quality in market vegetables. Standard grades and packages. Shipping methods. The relation of production methods to quality. Transit losses. The methods of marketing open to the producer. Recent trends in marketing and packaging.

**444. Laboratory Examination of Processed Food. (1-3). Credit 2. II** †

Practice and theory in chemical, physical, microscopic, and microbiological methods of food analysis and interpretation of results. Federal and State regulations will be considered. Prerequisite: Approval of the instructor.

**446. Commercial Fruit and Vegetable Canning. (2-3). Credit 3. II** †

An advanced course in pilot plant and laboratory operations pertaining to the production of canned fruits and vegetables. Prerequisite: Horticulture 311.

**481. Seminar. (1-0). Credit 1 each semester. I, II** †

Review of current experimental work in the field of horticulture, presented by staff members, graduate and senior students. Required of all graduate and senior students in horticulture.

**485. Problems in Horticulture. Credit 1 to 4. I, II, S**

Special problems in fruit and vegetable crop production and processing. Prerequisite: Senior classification or approval of Head of Department.

## FOR GRADUATES

**601. Environmental Relations of Fruit Plants. (3-3). Credit 4. I**

Water, soil, and temperature relations of fruit plants, and their modification by management practices will receive primary consideration. Specific problems of management will be studied under field conditions.

**602. Factors Influencing Fruit Production. (3-3). Credit 4. II**

Responses of the principal fruit plants to pruning, differentiation of fruit buds, and internal and external factors influencing fruit setting will be considered in detail. Field studies of important problems will receive considerable attention.

**603. Structure of Vegetable Plants. (3-3). Credit 4. II**

A consideration of the morphological and anatomical features of important families of vegetable plants and the relation of these features to growing practices and progressive improvement of the various plants.

**604. Physiology of Vegetable Plants. (3-3). Credit 4. I**

The topics of thermoperiodism, photoperiodism, nutrient deficiencies, water relations, temperature relations, fruit setting, growth, and seed germination will be taken up for each of the major vegetable crops. The recent developments in the use of hormones and selective herbicides in vegetable production will be discussed.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A comprehensive review of fundamental principles in research and methods employed in research. Practice in the various techniques which may be used in different investigations of horticultural problems.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in horticultural problems for thesis or dissertation.

## Department of Industrial Education

Professor C. H. Groneman,
Professor L. V. Hawkins; Associate Professor L. B. Hardeman; Assistant Professors C. A. Bertrand, J. L. Boone, Jr., L. V. Patterson

**105. Woodcraft. (1-5). Credit 3. I, II**

A comprehensive study of woods, wood products, and wood industries; including growth and botanical structure, production and uses, design, construction, and finishing.

**106. Sheet Metal. (1-5). Credit 3. II**

A study of industrial practices in developing, laying-out, and fabricating sheet metal products. Problems involving parallel-line, radial-line, and triangulation will be provided.

**107. Industrial Materials and Manufacturing Processes. (2-3). Credit 3. I, II**

A study including the processing of woods, metals, fuels, ceramics, and plastics; the fabrication of products from these materials; concepts of accepted manufacturing processes. Laboratory work will consist of problems involving experimentation.

**204. Development and Practice in Industrial Education. (3-0). Credit 3. II**

The history and development of industrial education, its meanings and objectives. Applications of vocational preparation for industry, vocational practices, and developments within industry.

**205. Ornamental Iron. (1-5). Credit 3. I**

A study of metals and metal products; including the alloying and proper use of iron, steel, aluminum, copper, brass, and bronze. Problems involving casting, spinning, machining, forging, welding, tubular construction, and electroplating are required.

**301. Methods of Teaching and Class Management. (2-0) or (3-0). Credit 2 or 3. I**

An introduction to the fundamentals of teaching as applied to industrial subjects; the management of the class, equipment, and supplies.

**304. Applied Industrial Electricity. (2-3). Credit 3. I, II**

A theoretical and practical study of electrical circuits, motors, generators, transformers, lighting, controls, and instruments. Laboratory experiences consist of experiments and projects in circuits and machines. Prerequisite: Physics 202.

**308. A Study of Modern Industries. (3-0). Credit 3. I**

The political, historical, and geographical factors which have a direct influence upon the development and distribution of industries. Specific studies of individual industries are made, such as iron and steel, paper, automobiles, petroleum, cement, leather, plastics, and textiles. Essential features of these industries are considered: location, machinery, power, raw material, market, labor.

**310. Course Making. (2-0). Credit 2. II**

Methods of outlining courses of study to meet the needs of the different types of classes. Each student will make a complete course for some particular subject.

**323. Methods of Teaching Mechanical Drawing. (1-3). Credit 2. I**

The student should have completed courses equivalent to Engineering Drawing 105, 106 before attempting this work. Analysis of problems and the selection of instructional material and methods of presentation for general drafting.

**326. General Metalwork. (1-5). Credit 3. I, II**

The designing and construction of power machinery including the development of plans for procedure, jigs, and fixtures. A study is made of materials and industrial processes and procedures of the foundry, welding, and machine shop. Prerequisites: Mechanical Engineering 202, 310.

**327. Industrial Arts Handcraft. (1-5). Credit 3. I**

Development and preparation of instructional materials; designing and building of teaching type projects and problems in plastics, leather, bookbinding, and other related handcraft activities. Prerequisite: Nine hours of shop courses.

**328. Industrial Accident Prevention. (3-0). Credit 3. I, II**

Analysis of fundamentals of accident prevention and their application to industrial supervision and management. Prerequisite: Junior classification.

**332. Plastics and Ceramics. (1-3). Credit 2. I**

Sources, manufacture, supply, and uses of plastics and ceramic materials; designs appropriate for plastics projects; essential processes in fabrication of plastics and ceramic objects.

**334. Upholstery. (1-3). Credit 2. II**

Instruction in the essentials of upholstery processes, including the construction of frames and foundations with and without springs. Prerequisite: Industrial Education 105.

**336. Design in the Arts and Crafts. (1-3). Credit 2. II**

Analysis and solution of design problems applicable to the arts and crafts. Experiences are provided for the designing of industrial products related to industrial arts through the use of common presentation media, proportion, balance, and harmony. Prerequisites: Engineering Drawing 105, 127; Industrial Education 105; Mechanical Engineering 106, 201, 202, 309.

**404. Visual Aids for Industrial Subjects. (1-2). Credit 2. I** †

This course is designed to develop an understanding of, need for, construction of, and use of visual aids for instruction in industrial subjects. Student activity consists of determining values of color in aids, use of projection equipment, mock-ups, posters, and blackboard illustrations.

**406. Industrial Guidance. (2-0). Credit 2. I** †

A study of the instruments and techniques of industrial guidance, its relation to education and industry, its meaning and purpose, and the analysis of methods of investigation and guidance procedures.

**409. Methods of Introducing Industrial Organization and Management into Industrial Schools. (2-0). Credit 2. S** †

The management of modern industrial enterprises and the possible adaptation to industrial schools.

**419. Laboratory of Industries Methods. (1-3). Credit 2. II** †

The student will make a study of the units of industries as generally recommended for public school industrial arts and will select, plan, and design problems and projects to meet these requirements.

**420. Follow-Up, Visitations, and Coordination in Part-Time Schools. (2-0). Credit 2. S** †

Selecting occupations suitable for young people to learn, placing students in suitable employment on a part-time basis, and coordinating their school duties with their work activities.

**423. Analysis Procedure. (1-2). Credit 2. I, II** †

Analysis is made of occupations to obtain content for instructional information. Jobs and operations are studied to determine the order and content of operation, job description, job evaluation, and job safety.

**424. Organization of Instructional Material. (1-2). Credit 2. S** †

A study will be made of published material available in the student's occupational field. Those parts found suitable for vocational classes will be indexed and organized for class use. Types of instruction sheets found necessary for efficient teaching will be written.

**427. Driver Education. (1-6). Credit 3. II**

A study and the application of state and federal regulations and policies governing the efficient and safe operation of automotive vehicles in traffic.

**429. Foremanship and Supervision. (3-0). Credit 3. I**

Positions of supervisory responsibility in an industrial organization, relation of supervisor to the supervised and supervisors; and procedures for meeting the responsibilities of the positions. Prerequisite: Senior classification.

**438. Industrial Safety. (2-3). Credit 3. II**

Continuation of Industrial Education 328. This course will include analysis of various types of accident prevention; organizations and programs in industry including detail study of typical safety departments; control of environmental hazards including inspections, investigations, mechanical guarding, maintenance, and the application of safety engineering principles in design and specifications. Prerequisites: Industrial Education 328; Industrial Engineering 302; and either Industrial Education 429 or Industrial Engineering 401 or registration therein.

**442. Supervised Teaching in Industrial Arts. (2-12). Credit 6. I, II**

Observation of, and participation in, the activities of a typical industrial arts classroom. The student will prepare lesson plans and present demonstrations to pupils in industrial arts in the public schools of Bryan and College Station. Prerequisites: Industrial Education 204, 301; senior classification.

**444. Industrial Distribution. (3-0). Credit 3. I, II**

A seminar approach to the study of the problems of industrial distribution with the assistance of representatives from the Southern Association of Distributors. Prerequisite: Junior classification.

**447. Electricity and Electronics. (2-3). Credit 3. I, II**

A continuation of Industrial Education 304. Laboratory experiences in the construction and operation of electronic devices, including power supplies, receivers, amplifiers, and electronic controls. Prerequisites: Industrial Education 304; Physics 202.

**481. Seminar in Industrial Education. (1-0). Credit 1. I, II**

General discussion of laws, legislation, certification, professional ethics, and other current problems relating to industrial and teaching fields. Prerequisite: Senior classification.

## FOR GRADUATES

**601. History of Industrial Education. (2-0). Credit 2. I, II, S**

A study of leaders, movements, and agencies with special emphasis on the economic, social, and philosophical factors which have contributed to the development of industrial education in the United States.

**602. Industrial Arts Administration and Supervision. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of industrial arts.

**603. Administration and Supervision of Vocational Industrial Education. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of vocational industrial education.

**604. Industrial Programs for Junior Colleges and Technical Schools. (2-0). Credit 2. I, II, S**

A study of the kinds, purpose, size, accreditation, growth, and teaching problems in the junior colleges, technical institutes, and adult schools, with particular emphasis on organization and presentation of industrial subject material in these schools.

**605. Problems in Industrial Safety. (2-0). Credit 2. I, II, S**

Basic reasons for accidents; prevention of industrial accidents; qualifications and duties of safety consultants; methods of making investigations; making investigations and how to prepare safety reports.

**606. Organization of Industrial Arts Department. (2-0). Credit 2. I, II, S**

Problems in determining the type and size of industrial arts programs for the various types and sizes of schools with plans for the organization of each.

**609. Methods of Teaching High School Drawing. (2-3). Credit 3. I, II, S**

A survey of the field of drawing. The designing and organizing of problems and teaching devices.

**614. Guidance Seminar. (2-0). Credit 2. I, II, S**

The organization of occupational information; educational and vocational guidance; counseling case problems. Prerequisite: Industrial Education 406 or equivalent.

**616. Methods of Teaching Industrial Arts in Secondary Schools. (2-0). Credit 2. I, II, S**

Selecting and organizing instructional material for problems in a particular arts activity.

**618. Tests and Measurements in Industrial Education. (2-0). Credit 2. I, II, S**

A study of testing and measuring devices and their application to industrial education subjects.

**619. Related Subjects in Part-Time Cooperative Programs. (2-0). Credit 2. I, II, S**

The organization and presentation of content material necessary in part-time cooperative programs, and the direction of the study of the students engaged in such programs.

**621. Philosophy of Vocational Education. (2-0). Credit 2. I, II, S**

The basic principles involved in the development and operation of industrial education programs under the State and Federal vocational laws.

**622. Philosophy of Industrial Arts Education. (2-0). Credit 2. I, II, S**

The principles involved in the development and operation of industrial arts courses and their purpose and function in the field of general education.

**623. Vocational Guidance Procedures. (3-0). Credit 3. I, II, S**

A workshop approach to the study of vocational guidance, programs, relationships, group techniques, and methodology of the clinical approach.

**626. Classroom Management and Shop Organization. (2-0). Credit 2. I, II, S**

The organization of routine procedures to facilitate teaching; setting up roll-checking devices, issuing procedures for tools and materials, keeping material inventory, using assignment charts and progress charts, using student leadership in routine non-teaching class and shop routine, and keeping records.

**627. Teacher Training for Local Supervisors of Trade and Industrial Classes. (2-0). Credit 2. I, II, S**

A course for local supervisors of industrial education programs or individuals responsible for conducting teacher training and upgrading programs on the local level. Methods for organizing and conducting teacher improvement programs, preparation and correlation of instructional material.

**628. Organization of Vocational Industrial Schools and Classes. (2-0). Credit 2. I, II, S**

Methods of making surveys, determining possible vocational education programs to meet the needs of different types of communities and the proper organization for these classes under the State plan for vocational education.

**630. Auto Mechanics. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to the economic selection, operation, and maintenance of the automobile.

**631. Electricity. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to practical theories and their application to electrical units within a high school program.

**632. Cabinet Making. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern methods of kiln drying, veneer construction, upholstery, and fabrication within the furniture industry.

**633. Machine Shop. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern practices and problems in the teaching of advanced machine shop.

**634. Ornamental Metal Work. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to mild steel and tubular metal.

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislation, certification, professional ethics, and other current problems relating to the industrial education teaching profession.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed to enable graduate majors to undertake and complete with credit limited investigations which do not fall within the thesis research and which are not covered by any other course.

**691. Research. Credit 1 to 4 each semester. I, II, S**

Research for thesis. Topic subject to approval of the Head of the Department.

## Department of Industrial Engineering

Professor A. R. Burgess,
Professors J. P. CoVan, S. A. Wykes; Associate Professor
R. L. Smith, Jr.; Instructor J. D. Ramsey

**202. Introduction to Industrial Engineering. (2-0). Credit 2. II**

The place of industrial engineering in the factory organization. Relationship of industrial engineering to management, purchasing, cost control, inspection, product development, and maintenance. Historical origins and development of the profession.

**302. Production Engineering. (1-2). Credit 2. I, II**

A coordinated study of manufacturing processes and equipment; operation sequence planning; economic aspects of equipment selection. Tooling and processing a product from product design to final assembly for quantity production. Emphasis is placed on latest developments in manufacturing techniques. Prerequisites: Mechanical Engineering 201, 310.

**401. Survey of Industrial Engineering. (3-0). Credit 3. I, II, S** †

A survey of the industrial engineering field; administrative decisions, plant location and design, layout of equipment, materials handling, production control, quality control, motion and time study, cost determination, wage plans, job evaluations, and merit rating. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

**403. Production Management. (3-0). Credit 3. I, II**

A survey course in the principles of production for business administration majors. Prerequisite: Senior classification in business administration.

**404. Motion and Time Study. (2-3). Credit 3. I, II** †

Standardization of job conditions; methods improvement and motion economy; use of flow process charts and diagrams, micromotion analysis of motion pictures, simo-charts, multiple-activity charts; allowances; rating methods; taking time studies; use of standard data and development of time formulas. Prerequisite: Junior classification in engineering or business administration.

**410. Current Practices in Industrial Engineering. Credit 3. S** †

A study of outstanding applications of industrial engineering principles through direct visit to the plants in the industrial Middle West. Course comprises a three-week tour, with emphasis on discussion with men in industry who have pioneered in new ideas in organization, labor relations, materials handling, incentive plans, production control, quality control, and other important management techniques. Prerequisite: Senior classification in industrial engineering.

**411. Wage and Salary Control. (3-0). Credit 3. II** †

Personnel procedures, methods of hiring employees, wage systems, wage administration, job evaluation, merit rating, salary classification, fringe benefits, direct and hidden labor costs, morale building. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

**412. Labor and Industry. (3-0). Credit 3. I, II** †

A brief review of the history of organized labor; critical study of fundamental Federal and State laws governing labor-management relations; study of current interpretations of labor laws, controversial labor-management issues and their solutions. Prerequisite: Senior classification in engineering or business administration, or approval of Head of Department.

**414. Statistical Control of Quality. (2-3). Credit 3. I, II** †

The engineering aspects of controlling quality through the use of statistical methods. Frequency distributions, control charts for variables, control for fraction defective and defects per unit. Sampling inspection plans. Design of specifications; tolerance systems and gaging. Administration of inspection. Prerequisite: Junior classification in engineering.

**415. Production Control. (1-3). Credit 2. I** †

The planning and control of production; operation analysis; routing; scheduling; dispatching; use of visual production charts and boards; inventory control; accumulation of material requirements; design of production control forms; forecasting production requirements; economic lot size; controls for job order; repetitive cycle, and straight line production. Prerequisite: Industrial Engineering 302, registration in 404.

**416. Factory Layout. (1-6). Credit 3. II** †

The layout of a complete factory for a selected product. Use of machine templates and models; design of materials handling systems; machine erection; auxiliary services; design of storerooms; loading docks; choice of building types; machine selection; estimate of unit costs; estimate of capital requirements: personnel organization; safety considerations in plant layout. Prerequisites: Industrial Engineering 404, 415.

**420. Manufacturing Costs. (3-0). Credit 3. II** †

The study of modern techniques used by engineers for controlling manufacturing costs. Computing probable returns from investments in new plants and new equipment. Use of break-even charts, profit graphs, machine replacement studies, comparison of alternative methods, standard costs, and budgeting, to control manufacturing costs. Introduction to operations research. Prerequisite: Industrial Engineering 414 or registration therein.

**451. Tool Engineering. (2-0). Credit 2. I**

Principles of selection and design of tools, jigs, fixtures, and gages. Economic considerations in choice of tooling methods. Estimated tooling costs. Dimensioning and tolerances. Methods of locating, clamping, and feeding. Principles of automation. Tool cataloguing, maintenance, and control. Prerequisites: Civil Engineering 305; Industrial Engineering 202, 302.

**452. Tool Design Laboratory. (0-3). Credit 1. II**

Solution of tool design problems on drawing board. Problems to include drill jig detailing and layout, punch and die design, milling fixture design, turret lathe tooling, and compound angle calculation. Prerequisites: Industrial Engineering 451; Mechanical Engineering 337.

**458. Programming of Digital Computers. (3-2). Credit 4. I, II, S** †

Operation of digital computer; flow charts; sub-routines; library programs; floating point; multiple precision; error analysis; optimum coding; symbolic coding; interpretive coding; automatic coding, practical applications. Prerequisite: Senior classification in engineering or physical sciences or approval of the Head of the Department.

**481. Seminar. (0-2). Credit 1. II**

Oral presentation by students of current developments in industrial engineering and management. Technical films on manufacturing operations and economic and social development of the United States. Prerequisite: Senior classification in industrial engineering.

**485. Special Problems in Industrial Engineering. Credit 1 to 3. I, II, S**

A course which permits work on a special project in industrial engineering. Project must be approved by the Head of the Department. Prerequisite: Senior classification in industrial engineering.

## FOR GRADUATES

**601. Industrial Surveys. (2-0). Credit 2. II**

Engineering problems related to industrial investigations, reports on organizations, personnel, capital equipment, financial policies, market, etc. Prerequisites: Industrial Engineering 415, 416.

**603. Human Relations in Industry. (4-0). Credit 4. I**

Causes of misunderstandings between management and labor; interdepartmental relations; conditions which influence the attitudes and productivity of the workers; principles of leadership; critical study of current labor-management problems. Direct worker incentive, seasonal bonuses, quality incentives, profit sharing plans for executives, profit sharing for wage earners. Prerequisites: Industrial Engineering 404, 412.

**604. Advanced Time and Motion Studies. (1-6). Credit 3. I**

Advanced methods in time and motion study; balancing operations in a group or assembly line; analysis of performance rating learning; memomotion and chronocyclegraph studies; fatigue effects; determination and application of elemental time data; statistical methods in time study. Prerequisite: Industrial Engineering 404 or the equivalent in practical time study experience in industry.

**608. Industrial Case Analysis. (3-0). Credit 3. II**

Practice in the application of principles to the solution of actual case problems involving broad management decisions. Special attention is given to problems indigenous to Texas industry. Prerequisite: Graduate classification in industrial engineering or approval of Head of Department.

**614. Advanced Quality Control. (3-3). Credit 4. I**

Advanced statistical methods applied to quality control problems; significance tests; correlation analysis; sequential sampling; analysis of variance; design of engineering experiments; response service techniques.

**615. Production and Inventory Control. (3-3). Credit 4. II**

Recent developments in the techniques used to control inventories and production by means of statistical analysis of the problems, simulation techniques, and mechanized execution of the inventory and production control functions. Prerequisites: Industrial Engineering 415; graduate classification in industrial engineering or approval of Head of Department.

**620. Principles of Operation Analysis. (4-0). Credit 4. II**

Use of mathematical models in making decisions; optimizing over-all policies; probability methods, linear programming; transportation models; queing theory; learning curves; information theory; Monte Carlo methods; use of high speed computers for managerial control. Prerequisites: Industrial Engineering 420, 614; graduate classification in industrial engineering.

**651. Tool Design. (3-3). Credit 4. II**

Design of automatic machine tools; tracer and director control of tool paths; automatic feeding, holding, indexing and ejection of work pieces; tool replacement analysis. Study of cutting forces, workpiece and fixture distortion. Automatic inspection and sorting, assembly, and packaging. Prerequisites: Industrial Engineering 451, 452; graduate classification in industrial engineering.

**681. Seminar. (2-0). Credit 2. II**

Group study and discussion of current developments in industrial engineering practices as reported in the literature and as presented by representatives from industry. Prerequisite: Graduate classification in industrial management or industrial engineering.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigations of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in industrial engineering.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in the industrial engineering field; subject to meet the needs of the individual student.

## Department of Journalism

Professor D. D. Burchard;
Associate Professor H. O. Miller; Assistant Professors W. D. Calvert,
J. E. Redden

**201. News Writing. (2-3). Credit 3. I**

Beginner's reporting; study of types of news; leads; body treatment of story; feature in lead; facts; background and practice in writing straight news story. Prerequisite: Knowledge of typing.

**202. Beginning News Reporting. (2-3). Credit 3. II**

Study of news sources; style; interviewing; news analysis and discussion; handling of various types of news; emphasis on clear writing; practical reporting experience. Prerequisite: Journalism 201.

**205. Principles of Typography. (2-3). Credit 3. I**

Effective use of type, printing equipment, materials and processes for advertising, editorial and commercial printing production; brief history of printing; understanding of illustrations through engravings and stereotype plates; proofreading; copy-fitting; fundamentals of layout and makeup for publications. Prerequisite: Approval of instructor.

**300. Summer Practice. Ten weeks; required; no credit.** S

Summer practice in newspaper, magazine, or other communications office, as approved by the Department Head. Required previous to registration for fourth year. Prerequisite: Junior classification.

**304. Feature Story Writing. (2-2). Credit 3. I**

The writing of magazine and feature stories; types of feature articles; sources; titles; markets; slanting articles for particular markets; style; word usage; beginnings; illustrations.

**306. Newspaper Production and Management. (2-2). Credit 3. II**

The business of managing a newspaper; the community newspaper; study of the weekly and small town daily newspaper as a service organization; social responsibilities; influence of the community; mechanics of printing; managership; business side of conducting a paper. Prerequisites: Journalism 202, 205.

**307. News Editing. (2-3). Credit 3. I**

The editing of news; intensive training in publication style, news evaluation, copy reading mechanics and techniques, headline writing and proofreading; provides understanding of journalistic responsibilities, ethics, laws of communication and the need for accuracy. Prerequisites: Journalism 202, 205.

**308. Newspaper Advertising. (2-3). Credit 3. II**

Advertising layout and copy for newspapers and other publications; intensive practice in newspaper layouts; writing of retail copy; servicing of newspaper accounts. Prerequisite: Approval of instructor.

**309. Advertising Copy, Layout and Production. (2-3). Credit 3. II**

Application of tested advertising methods to the preparation of merchandising copy; layout design; and production of publication advertising. Sales appeals; attention factors, layout planning, illustrations, copy writing, copy testing, and production methods and problems. Prerequisites: Journalism 205, 308.

**311. Radio and Television News Writing. (2-2). Credit 3. II, S**

Study and analysis of basic methods of writing for radio and television; special emphasis on techniques required in processing news copy; pictures and film. Thorough groundwork in fundamentals of radio and television news style; guidance in newsroom operation, getting the story, filming the news; scripting and editing, and handling equipment.

**315. Photography. (1-3). Credit 2. I, II, S**

Fundamentals of photographic theory and practice; cameras, lenses and shutters; light meters; properties of photographic film and paper; exposure and development of the negative; black and white printing processes; use of filters; lighting (natural, flash, and flood). Emphasis on photography as a medium of communication.

**321. Industrial Journalism. (2-2). Credit 3. I, II, S**

A study of the technique of writing technical articles and reporting news related to engineering, industry, science, and other specialized interests; preparation of fact articles for technical and trade journals.

**406. Publicity and Public Relations. (3-0). Credit 3. II** †

Practical analysis of the various fields of publicity and public relations. Students make surveys and perform laboratory work on actual projects. Theory and practice in various aspects of functioning publicity, including news writing, advertising, and radio.

**409. History and Principles of Journalism. (3-0). Credit 3. I**

Development of American journalism from colonial times to the present, projecting the press as an institution against the background of the economic, social, and political history of the nation. Includes ethics of the profession.

**410. Publications Editing and Designing. (1-3). Credit 2. II**

Advanced editing, headline writing, rewriting, and news evaluation for all types of publications; intensive laboratory practice in advanced copyreading, telegraph wire copy editing, story selection, page makeup, picture and feature material editing, editorial supervision and training in planning various publication formats. Prerequisite: Journalism 307.

**412. Editorial Writing. (3-0). Credit 3. II**

The writing of editorials; editorial page; editorial campaigns; what constitutes editorial policy; ethics in editorial writing. Prerequisite: Journalism 304.

**415. Agricultural Journalism. (2-2). Credit 3. I, II, S**

The principles of newspaper writing; especially the preparation of material for agricultural papers and country weeklies; the part a country paper should play in country development; in the laboratory work, opportunity is given for actual writing for newspapers and farm journals. The Information Office of the College and the Information Department of the Extension Service are cooperative in the course.

**462. High School Journalism and Publications. (3-0). Credit 3. S** †

Problems of advising and sponsoring school newspapers and yearbooks; the school publication as a public relations tool; selecting and training the staff; financing school publications; planning content of high school journalism course. Prerequisites: Twelve semester hours of English; approval by Head of Department of Journalism.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

Research problems related to the communications field. Individual work, fitted to the special needs of the specific student as determined by his interests and aptitude.

## Liberal Arts

**201. Survey of Music Literature. (1-2). Credit 2. I, II, S**

A study of various types and styles of music literature. Lectures supplemented by listening. Music illustrations selected primarily from standard concert repertoire. For the music listener with little or no formal training in music.

**301. Introduction to Philosophy. (3-0). Credit 3. I**

An introduction to the nature of philosophic inquiry; theories of reality and of knowledge; including idealism, naturalism, and pragmatism; the relation of philosophy to religion, science, history, politics, and education. The aim is to stimulate thinking about problems of conduct and to develop principles and methods of passing judgment on current social issues. Prerequisite: Junior classification.

**304. Philosophies of Life. (3-0). Credit 3. II**

A survey including the biographical and historical backgrounds of the philosophies of the major philosophical thinkers from Socrates to Russell, and of their influence upon the thinking of mankind; incidental consideration of the ideals and values involved in moral, religious, esthetic, and scientific points of view.

**311. Use of Library Resources. (0-2). Credit 1. I, II**

A course designed to develop in students skill in the use of library resources at the upper level. Emphasis placed on specialized reference tools. Prerequisites: Completion of sophomore English; junior classification.

## Department of Mathematics

Professor E. C. Klipple,
Professors R. E. Basye, B. W. Brewer, J. T. Hurt, H. A. Luther; Associate Professors Dan Hall, J. T. Kent, W. S. McCulley, R. V. McGee, B. C. Moore, S. A. Sims, M. E. Tittle; Assistant Professors K. R. Bailey, J. R. Hillman, F. N. Huggins*, R. R. Lyle, C. M. Pearcy, Jr., H. D. Perry, Peter Terwey, Jr.; Instructors O. L. Baugh, J. E. Harris, L. M. Hovorak, S. M. Kindall, R. A. Knapp, C. B. Moehlman, N. W. Naugle, W. J. B. Oldham, Jr., A. R. Wapple, M. L. Williams

**101. Algebra. (3-0). Credit 3. I, II, S**

Factoring, fractions, linear equations in one unknown, graphs, systems of linear equations, exponents and radicals, quadratic equations.

**102. Algebra. (3-0). Credit 3. I, II, S**

Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

**103. Plane Trigonometry. (3-0). Credit 3. I, II, S**

Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, inverse trigonometric functions, trigonometric equations.

**104. Analytic Geometry. (3-0). Credit 3. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, transformation of coordinates, polar coordinates, parametric equations, plane, quadric surfaces. Prerequisite: Mathematics 103.

**110. Survey Course in Mathematics. (3-0). Credit 3. I, II, S**

Linear equations, quadratic equations, functions and graphs, derivatives of polynomials, integrals of polynomials, systems of equations, logarithms, progressions, binomial theorem, compound interest and annuities, permutations and combinations, probability.

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*On leave of absence.

**116. Plane Trigonometry and Analytic Geometry. (4-0). Credit 4. I, II**

Trigonometric functions, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, functions and graphs; the straight line, circle, parabola, ellipse, hyperbola, polar coordinates, sketching of surfaces. Prerequisite: Mathematics 102. (For students registered in architecture.)

**120. Analytic Geometry and Calculus. (5-0). Credit 5. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, variables, functions, limits, derivatives and differentials for polynomials and applications, integration of polynomials and applications, differentiation of algebraic functions. Prerequisites: Mathematics 102, 103. **A student may not receive credit for Mathematics 120 and also for Mathematics 104 or 209.**

**209. Calculus. (3-0). Credit 3. I, II, S**

Variables, functions, and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Mathematics 104.

**210. Calculus. (3-0). Credit 3. I, II, S**

Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Mathematics 120 or 209.

**223. Differential and Integral Calculus. (4-0). Credit 4. I, II**

Limits, rate of change, the derivative, maxima and minima, differentiation of polynomials; the definite integral; volume, differentiation of implicit functions, special devices for integration, center of gravity, moment of inertia, double integrals. Prerequisite: Mathematics 116. (For students registered in architecture.)

**303. Theory of Equations. (3-0). Credit 3. I, II**

Complex numbers, remainder theorem, factor theorem, synthetic division, nature of roots of equation, ruler and compass construction, solution of cubic and quartic equations, isolation of a root, solution of numerical equations, determinants, matrices, systems of linear equations, symmetric functions, elimination, resultants, discriminants. Prerequisite: Mathematics 210.

**307. Calculus. (3-0). Credit 3. I, II, S** †

Introduction to series, Taylor's series, partial differentiation, elementary differential equations, applications. Prerequisite: Mathematics 210.

**308. Differential Equations. (3-0). Credit 3. I, II, S** †

Fourier series, linear equations, solution by Laplace transforms and by series, applications. Prerequisite: Mathematics 307.

**405. Vector Analysis. (3-0). Credit 3. I, II** †

Elementary operations, vector and scalar products of two vectors, vector and scalar products of three vectors, differentiation of vectors, the differential operators, applications to electrical theory, dynamics, mechanics, and hydrodynamics. Prerequisite: Mathematics 210.

**409. Advanced Calculus. (3-0). Credit 3. I, II, S** †

The concept of a function, limit of a sequence, continuity, theorems on continuous functions, the definite integral, the derivative, mean value theorems, hyperbolic functions, improper integrals. Prerequisite: Mathematics 210.

**410. Advanced Calculus. (3-0). Credit 3. II** †

Theory of plane curves, mechanics of a particle. Taylor's theorem and applications, numerical integration, convergence and divergence of series, power series, periodic functions, Fourier series. Prerequisite: Mathematics 409.

**411. Mathematical Probability. (3-0). Credit 3. I** †

Introductory concepts, permutations and combinations, elementary principles of the theory of probability, probability of experiment, distribution functions and continuous variables, averages, curve fitting, applications. Prerequisite: Mathematics 210.

**414. Mathematical Statistics. (3-0). Credit 3. I, II, S** †

History and terminology of statistics, probability theory, discrete and continuous distributions, expected values, moments, sampling, confidence intervals, tests of hypotheses. Prerequisite: Mathematics 210.

**415. Modern Algebra. (3-0). Credit 3. II** †

Integers, rational numbers, real numbers, complex numbers. Groups, rings, integral domains, fields. Polynomials over a field. Prerequisite: Mathematics 210.

**417. Numerical Analysis. (3-3). Credit 4. I, II, S** †

Simultaneous linear equations, elementary matrix theory, numerical integration and differentiation, finite differences and applications, numerical solution of differential equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 308 or registration therein.

## FOR GRADUATES

**600. Fundamental Mathematics in Secondary Schools. (3-0). Credit 3. S**

Basic concepts of arithmetic, algebra, geometry, and trigonometry as viewed from the standpoint of higher analysis; famous problems; construction of tables and slide rules; other topics designed to help vitalize the teaching of high school mathematics. Prerequisite: Mathematics 210.

**601. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Surface integrals, line integrals, vector analysis, partial differential equations, elementary complex variables, applications. Prerequisite: Mathematics 308.

**602. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Fourier integrals, Bessel and Legendre functions, Laplace's equation, the diffusion equation, the wave equation, Green's functions. Prerequisite: Mathematics 601.

**606. Theory of Probability. (4-0). Credit 4. II**

Formulae for combinations and arrangements, problems in total and compound probability, expectation, risk, the problem of repeated trials, Stirling's formula, probability integral, theorems in mean value, dispersion, determination of best value, the law of error, the correlation coefficient, curve fitting. Prerequisite: Mathematics 411.

**607. Real Variables. (4-0). Credit 4. I**

Fundamental theory of number sets and point sets, elementary applications to real functions, theory of linear measure. Prerequisite: Mathematics 409.

**608. Real Variables. (4-0). Credit 4. II**

Measurable functions, the Riemann integral, the Lebesgue integral, applications to real functions and series. Prerequisite: Mathematics 607.

**609. Numerical Analysis. (3-3). Credit 4. I**

Linear programming, matrix calculations, theory of errors, Lagrangian interpolation, approximation of functions, acceleration of convergence, Monte Carlo methods, topics in the solution of equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 417.

**610. Numerical Methods in Differential Equations. (3-3). Credit 4. II**
Elementary numerical solutions, analytical foundations, systems of equations, higher order equations, two-point boundary problems, numerical methods for partial differential equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 417.

**611. Ordinary Differential Equations. (4-0). Credit 4. I**
Definitions, general methods of solving first order differential equations, singular solutions, geometrical applications, trajectories, motions of a particle, special methods for the equation of the first order, linear equations of the second order, the method of successive approximations, systems of ordinary differential equations, interpolation and numerical integration, symbolic methods, numerical solution of differential equations. Prerequisite: Mathematics 308.

**612. Partial Differential Equations. (4-0). Credit 4. II**
General solutions of first order partial differential equations, solution of second order equations from physics and mechanics by separation of variables, solution of second order equations by Green's functions. Prerequisite: Mathematics 611 or the equivalent.

**615. Advanced Algebra. (4-0). Credit 4. I**
Polynomials and their most fundamental properties, determinants, linear dependence, linear equations, theorems concerning the rank of a matrix, linear transformations and combinations of matrices, invariants, bilinear forms, quadratic forms, pairs of quadratic forms. Prerequisite: Mathematics 308 or 409.

**616. Advanced Algebra. (4-0). Credit 4. II**
Properties of polynomials, factors and common factors of polynomials in one variable and of binary forms, factors of polynomials in two or more variables, integral rational invariants, symmetric polynomials, elementary divisors, the equivalence and classification of pairs of bilinear forms and collineations, equivalence and classification of pairs of quadratic forms. Prerequisite: Mathematics 615.

**617. Complex Variables. (4-0). Credit 4. I, S**
Fundamental theory of analytic functions, conformal mapping, applications. Prerequisite: Mathematics 601.

**618. Complex Variables. (4-0). Credit 4. II**
The Schwarz-Christoffel theorem, infinite products, meromorphic functions, elliptic functions, special functions, applications. Prerequisite: Mathematics 617.

**620. Fourier Series and Allied Topics. (4-0). Credit 4. I**
Convergence of Fourier series, the cosine series, the sine series, uniform convergence of Fourier series, differentiation and integration of Fourier series, Fourier integrals, Bessel functions. Prerequisite: Mathematics 608.

**622. Laplace Transforms. (4-0). Credit 4. II, S**
Fundamental theorems concerning Laplace transforms. Applications to ordinary and partial differential equations, difference equations, and integral equations. Prerequisite: Mathematics 601.

**623. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. II**
Derivation and solution of the differential equations of chemistry and chemical engineering, mathematical theory of distillation, series solutions of differential equations, Bessel functions. Prerequisite: Mathematics 308.

**624. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. I**
Equations of finite differences, applications of partial differentiation, solution of partial differential equations, Fourier integrals, orthogonal systems, numerical and graphical methods, theory of errors. Prerequisite: Mathematics 623.

**625. Matrix Algebra and Tensor Calculus. (4-0). Credit 4. I, II, S**
Elementary matrix operations; linear transformations; canonical and modified triangular forms of matrices; inverse of a non-singular matrix; diagonal and rotation matrices; characteristic roots of a matrix; symmetric matrices; tensor concept; covariance and contravariance; algebra of tensors; metric tensors; Christoffel's symbols; covariant differentiation of tensors; applications. Prerequisite: Mathematics 405 or 601.

**627. Theory of Numbers. (3-0). Credit 3. I**
Ordered rings; the ring of integers; Euclidean rings; unique factorization; congruences; the Fermat-Euler Theorem; residues of powers; quadratic residues; the Legendre, Jacobi, and Kronecker symbols; quadratic reciprocity; diophantine equations; the series of primes; tests for primality. Prerequisite: Mathematics 409 or 415.

**628. Theory of Numbers. (3-0). Credit 3. II**
Commutative rings; ideals and residue class rings; principal ideal rings; unique factorization rings; quadratic fields; fields of higher degree. Prerequisite: Mathematics 627.

**641, 642. Modern Analysis. (4-0). Credit 4 each semester. I, II**
Recent developments in the theory of functions. Prerequisite: Mathematics 608.

**685. Problems. Credit 1 to 4 each semester. I, II, S**
A course offered to enable students to undertake and complete with credit limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Mathematics 601.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis or dissertation.

## Department of Mechanical Engineering

Professor C. M. Simmang,
Professors C. W. Crawford, E. S. Holdredge, L. S. O'Bannon, B. A. Rogers, J. G. H. Thompson, W. I. Truettner, R. M. Wingren; Associate Professors J. H. Caddess, D. W. Fleming, R. H. Fletcher, B. J. Fluker, A. M. Gaddis, R. H. Gibbs, W. S. Guthrie; Assistant Professors O. W. Albritton, A. B. Alter, R. W. Downard, Earl Logan, Jr.*, T. A. Noyes, J. V. Perry, Jr., P. D. Weiner; Instructors S. E. Brown, R. H. Gibson, E. D. Kranz, J. M. Nash, H. G. Stallings, W. F. Swinson, C. A. Whitehurst

**101. Engineering Problems. (0-3). Credit 1. II**
Use of the slide rule, dimensional equations, solution of problems involving various fields of engineering, trigonometry, and principles of motion. Logical thinking, neatness, and form stressed throughout. Prerequisites: Mathematics 101 or 102, and 103 or 116, or registration therein.

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*On leave of absence.

**105. Carpentry and Mill Work. (1-6). Credit 3. I, II**

This course is designed for freshman architectural students and for business administration freshmen taking building products marketing. The course includes simple building constructions such as framing, roof construction, general carpentry work, exterior and interior finishing, forms, working drawings, and mill work including the use of machines, hand tools, safety, and built-in cabinet construction in the home.

**106. Cabinet Making. (1-6). Credit 3. II**

Design, rod making, construction, and finishing of furniture; glues, varnishes, lacquers, and other finishing materials; production methods; care and maintenance of woodworking machinery.

**201. Manufacturing Processes. (0-3). Credit 1. I, II**

Simple pattern layouts and construction of patterns; pattern storage; costs and weights of patterns and castings; kiln-drying and moisture content of pattern woods; the patternmaking industry. Cupolas; gas fired furnaces, moulding sands; core-making; foundry layouts; and practice in moulding and casting both ferrous and non-ferrous metals. Welding materials and equipment, demonstration and practice in Heliarc, Atomic-hydrogen, metallic arc, electrical resistance, and oxy-acetylene. Prerequisite: Engineering Drawing 105.

**202. Manufacturing Processes. (0-3). Credit 1. I, II**

A continuation of Mechanical Engineering 201, including advanced methods of patternmaking, moulding, and weld inspection and testing, fundamentals of joint design and metallography. Prerequisite: Mechanical Engineering 201.

**212. Engineering Mechanics. (3-0). Credit 3. I, II, S**

Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity; and moment of inertia. Prerequisites: Mathematics 210 or registration therein; Physics 218.

**220. Engineering Mechanics. (4-0). Credit 4. I**

The principles of mechanics as related to both statics and kinetics. A condensation of the material in Mechanical Engineering 212 and 313. Prerequisites: Mathematics 210 or registration therein; Physics 218.

**309. Machine Production Techniques. (0-3). Credit 1. I, II, S**

Lecture demonstrations and practice in safety, care of machines and hand tools, shop organization, cutting speeds and feeds, standard machine tool work in metals, single point tool grinding, layout, drilling, tapping, shaping, turning, boring, threading, and milling. Prerequisite: Engineering Drawing 105.

**310. Machine Production Techniques. (0-3). Credit 1. II, S**

A continuation of Mechanical Engineering 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures, and fixed gages. Prerequisite: Mechanical Engineering 309.

**313. Engineering Mechanics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 212, including kinematics, both graphical and algebraic solutions of relative linear velocities and accelerations, kinetics, dynamics of translation and rotation, work, energy, impact, momentum, and balancing. Prerequisite: Mechanical Engineering 212.

**323. Thermodynamics. (4-0). Credit 4. I, II, S**

The thermodynamics of ideal gases, including non-flow and steady-flow processes; internal combustion engines; gas compressors; combustion; vapors and vapor mixtures, boilers, and vapor cycles. Prerequisites: Mathematics 210; Physics 219.

**327. Thermodynamics. (3-0). Credit 3. I, II, S**

The thermodynamics of gases, vapors, and liquids in various non-flow and steady-flow processes; internal combustion engines; gas compressors; power plant equipment. Prerequisites: Mathematics 210; Physics 219.

**328. Thermodynamics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 327, covering gas mixtures, variable specific heats, turbines, modern power plant cycles, refrigeration, air conditioning, heat transfer. Prerequisite: Mechanical Engineering 323 or 327.

**329. Advanced Cabinet Making. (1-6). Credit 3. II**

Cabinet and furniture design, estimating, detailing, rod making construction and finishing. A major project is to be constructed from a set of drawings and details made by the student. A term paper is required on some related subject, such as design, finishing, safety, production methods, etc. Prerequisite: Mechanical Engineering 105 or 106, or equivalent experience.

**337. Kinematic Drawing. (0-3). Credit 1. I**

Problems and drafting involving linkages, centros, relative linear velocities, cams and gears. Designed especially to supplement the kinematics of motion included in the course of dynamics for industrial engineers. Prerequisite: Mechanical Engineering 313 or registration therein.

**338. Kinematics and Machine Design. (2-3). Credit 3. I, II, S**

A study of instantaneous centers, velocities, and accelerations, followed by the design of cams and an introduction to elementary machine design. Prerequisites: Civil Engineering 305 and Mechanical Engineering 313, or registration therein.

**340. Physical Metallurgy. (2-3). Credit 3. 1, II, S** †

The fundamentals of the physical metallurgy of irons, steels, and their alloys; precipitation hardening and corrosion resistance of non-ferrous alloys; laboratory work in polishing, etching, and preparation of specimens, making and studying photomicrographs. Prerequisite: Civil Engineering 305.

**344. Fluid Mechanics. (3-0). Credit 3. I, II, S**

Application of the laws of statics, bouyancy, stability, energy, and momentum to the behavior of ideal and real fluids. A study of dimensional analysis and similitude and their application to flow through ducts and piping, dynamic lift and related problems. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**346. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. II**

The application of mechanics and thermodynamics to the behavior of ideal and real fluids. A study of the fundamental laws relating to heat flow. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**403. Engineering Laboratory. (1-3). Credit 2. I, II, S**

Study and testing of instruments used in laboratory work and simple tests of engines, pumps, and flow devices. Engineering analysis and analogue theory are stressed. Calculations and written reports on the investigations and results obtained. Prerequisite: Mechanical Engineering 323 or 327.

**404. Engineering Laboratory. (1-3). Credit 2. I, II, S**

A continuation of Mechanical Engineering 403 with more advanced work in the analysis of steam and internal combustion engines, turbines, fans, and refrigeration machinery. Prerequisites: Mechanical Engineering 328, 344, 403.

**409. Structure and Properties of Alloys. (2-3). Credit 3. I**

This course gives a description of the fundamental properties of alloys. These alloys are the base on which most of present-day technology rests. Prerequisites: Chemistry 102; Mechanical Engineering 340; Physics 220.

**410. Internal Combustion Engines. (3-0). Credit 3. I, II** †

Thermodynamics of cycles for internal combustion engines and gas turbines including fuels and combustions. Performance characteristics of various types of engines. Prerequisite: Mechanical Engineering 323 or 327.

**414. Steam and Gas Turbines. (3-0). Credit 3. I** †

Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; study of steam turbines and of special cycles. Prerequisites: Mechanical Engineering 328, 344.

**417. Power Engineering. (4-0). Credit 4.* I, II, S**

The application, operation, and performance of all types of power plant equipment. The selection and arrangement of such equipment from the standpoint of economics. Prerequisites: Mechanical Engineering 328, 344.

**420. Marine Engineering. (3-0). Credit 3. II**

Applications of power engineering to ship propulsion and to auxiliary machinery in merchant ships, including steering engines, electric generators, fresh water distillers, refrigeration plants, and devices for safe navigation. Elementary naval architecture, stability of ships under effects of weather, damage control, general aspects of nuclear propulsion plants and small boat engines are considered. Prerequisite: Mechanical Engineering 344 or 346.

**432. Automotive Engineering. (3-0). Credit 3. II**

The modern automobile, its power plant, fuels, performance, vibration, dynamic balancing, electrical equipment, braking systems, construction, etc., from an engineering standpoint. Prerequisites: Mechanical Engineering 313, and 323 or 327.

**436. Air Conditioning and Refrigeration. (3-0). Credit 3. II** †

Application of the principles of thermodynamics to equipment and methods of practical production of refrigeration. The thermodynamics of conditioning air. Selection of equipment, piping, and duct layouts for heating, ventilating, and air conditioning. Prerequisite: Mechanical Engineering 323 for non-mechanical engineering majors; 328 for mechanical engineering majors.

**445. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to various machine parts, such as columns, screws, shafts (considering combined stresses), bearings, brakes, springs, and complete machines. Prerequisites: Mechanical Engineering 310, 338, 340.

**446. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to problems encountered in transmission of power by means of belts, chains, and gears. Prerequisite: Mechanical Engineering 445 or registration therein.

**457. Engineering Analysis. (3-0). Credit 3. II** †

Mathematical and experimental methods of solving problems in the various fields of engineering. Dimensional analysis, representation and analysis of experimental data, graphical and numerical solution of differential equations, analogies and computers. Prerequisites: Mathematics 307; senior classification in engineering.

**459. Mechanical Vibration. (3-0). Credit 3. II** †

The basic theory of vibrating systems with single and multiple degrees of freedom and the principles of transmission and isolation of vibrations. Prerequisites: Mathematics 307; Mechanical Engineering 313.

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*Becomes (3-0), credit 3, effective February 1, 1962.

**461. Heat Transfer. (3-0). Credit 3. I** †

Study of conduction, convection, and radiation separately and in combination; steady and unsteady states; mathematical treatments; graphical and numerical solutions, dimensional analysis. Prerequisites: Mathematics 307; Mechanical Engineering 344.

**481. Seminar. (0-2). Credit 1. I**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of engineering and manufacturing processes. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

A continuation of Mechanical Engineering 481 but with more extensive reports and with lectures from visitors. Prerequisite: Senior classification.

**485. Advanced Problems in Mechanical Engineering. Credit 2 to 5. I, II, S** †

Special problems in the various phases of mechanical engineering are assigned to individual students or to groups. Readings are assigned, and frequently consultations are held. Prerequisites: By permission and senior classification in mechanical engineering.

## FOR GRADUATES

**601. Advanced Machine Design. (4-0). Credit 4. I**

A study of combined stresses and theories of failure, statically indeterminate structures, piping design, flat plates, curved beams, and the theory of lubrication. Prerequisites: Mathematics 307 and 308 or registration therein; Mechanical Engineering 445 or the equivalent.

**603. Power Plants. (2-6). Credit 4. II**

The design of central and isolated power plants with special attention to over-all economic operation. Prerequisite: Mechanical Engineering 417.

**605. Engineering Analysis. (4-0). Credit 4. I, S**

A study of analytical, graphical, and approximate methods of solving problems common to engineering; dimensional analysis and model study; design of experiments; statistical analysis and interpretation of test data including derivation of empirical equations. Prerequisite: Mathematics 308; or registration therein.

**613. Engineering Dynamics. (4-0). Credit 4. II**

A study of the dynamics of particles and of rigid bodies; the virtual work principle, Lagrange's and Euler's equations of motion, and Hamilton's principle applied to engineering problems. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**615. Advanced Engineering Thermodynamics. (4-0). Credit 4. I**

The theories of thermodynamics and their application to the more involved problems in engineering practice. Prerequisite: Mechanical Engineering 328.

**616. Heat Transmission. (4-0). Credit 4. II**

The fundamental laws relating to heat flow, the application of these laws to engineering materials used in various industrial processes; a study of recent developments by reference to current literature. Prerequisites: Mathematics 308; Mechanical Engineering 605.

**617. Mechanical Vibrations. (4-0). Credit 4. I**

The theory of vibrations of machines and structures. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**618. Advanced Air Conditioning. (2-6). Credit 4. II**

Thermodynamics of air vapor mixtures applied to problems of air conditioning. Practice in design and selection of equipment with emphasis on the preparation of plans and specifications. Prerequisite: Mechanical Engineering 436.

**619. Theory of Elasticity. (4-0). Credit 4. II**

Applications of the theory of elasticity to machine design. Study of compatability equations, stress functions, energy methods, etc. Prerequisites: Civil Engineering 633 or Mechanical Engineering 601; Mathematics 601 or registration therein.

**620. Experimental Stress Analysis. (3-3). Credit 4. I**

Use of experimental methods in machine design. Study of photoelasticity, electric strain gauges stresscoat, etc. Prerequisites: Civil Engineering 633 or Mechanical Engineering 601 or registration therein; Mathematics 308 or registration therein.

**621. Fluid Mechanics. (4-0). Credit 4. II**

A study of flow problems encountered in the design of water, gas, and steam turbines; centrifugal and axial-flow pumps and compressors. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**640. Ferrous Metallurgical Design. (3-3). Credit 4. II**

A detailed study of the phase transformations in steel, the resulting changes in mechanical properties, the peculiarities of the steels, and their influence upon the design of machine elements. Prerequisite: Mechanical Engineering 340.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

The content will be adapted to the interest and needs of the group enrolled.

**691. Research. Credit 1 or more each semester. I, II, S**

Methods and practice in mechanical engineering research for thesis or dissertation.

## Department of Military Science and Tactics

Frank L. Elder, Colonel, Infantry, USA
Professor of Military Science and Tactics

## UNITED STATES ARMY

Associate Professors: Lieutenant Colonels L. C. Brown, R. E. Byrns, J. H. Remele; Majors W. R. Haley, Jr., J. H. Irving, H. A. Lowe, Jr., D. D. McCorvey, R. M. Peach; Assistant Professors: Captains J. D. Bennett, O. E. Biggs, D. J. Chandler, J. W. Ferguson, S. J. Grant, Jr., G. W. Hartnell, W. L. Martin, W. T. Rife, Jr., W. H. Rhodes, J. W. Simmons, L. L. Stevenson; Chief Warrant Officer G. H. Rydell; Instructors: Master Sergeants R. M. Fleshman, W. H. Gard, W. G. Harris, T. I. Hensley, H. G. Latham, C. C. Lee, A. M. Linton, C. E. McCollum, A. E. Miller, C. A. Pantalion, G. E. Switzer, Jr., K. H. Truitt, J. W. Turnipseed; Sergeants First Class J. R. Brown, R. L. Dennis, D. A. Herring, E. V. Hetzel, W. C. Howley, J. T. Lyons, J. A. Mayne, P. L. Retherford, W. E. Weldon; Sergeant W. L. Bowdon

### Basic Course of Military Science

**121. First Year Basic Military Science. (0-3). Credit 1. I**

Theoretical: Organization of the Army and ROTC, individual weapons and marksmanship, American military history.

Practical: Leadership, drill, and command; individual weapons and marksmanship.

**122. First Year Basic Military Science. (0-3). Credit 1. II**
A continuation of Military Science 121.

**221. Second Year Basic Military Science. (0-3). Credit 1. I**
Theoretical: Map and aerial photograph reading, United States Army and national security, crew-served weapons and gunnery.

Practical: Leadership, drill, and command.

**222. Second Year Basic Military Science. (0-3). Credit 1. II**
A continuation of Military Science 221.

### Advanced Course of Military Science

**321. First Year Advanced Military Science. (2-3). Credit 3. I**
Theoretical: Leadership, military teaching principles, branches of the Army, small unit tactics and communication, and pre-camp orientation.

Practical: Leadership, drill, and command.

**322. First Year Advanced Military Science. (2-3). Credit 3. II**
A continuation of Military Science 321.

**421. Second Year Advanced Military Science. (2-3). Credit 3. I**
Theoretical: Operation, logistics, Army administration, military justice, and service orientation.

Practical: Leadership, drill, and command.

**422. Second Year Advanced Military Science. (2-3). Credit 3. II**
A continuation of Military Science 421.

## Department of Modern Languages

Professor J. J. Woolket,
Professor J. A. Dabbs; Associate Professors E. C. Breitenkamp, T. E. Comfort*, J. M. Skrivanek; Instructors T. J. Daigle,
M. K. Hanau-Schaumburg, Gerardo Saenz

Foreign languages, in addition to their unquestioned cultural value, have a utilitarian value of great importance for those expecting to engage in research or purely practical pursuits. It is, therefore, advisable, when possible, for students to take up such a language during their undergraduate studies and thereby have the use of it when they begin advanced work in agriculture, engineering, or in pure science. Otherwise, as often happens, their specialization may be hampered or delayed. A language laboratory is available for those interested in developing a command of the spoken language.

**100. Spoken English for Foreign Students. (3-0). Credit 3. S**
Instruction in American-English pronunciation; intensive class drill; individual laboratory work in comprehension and practice in correct pronunciation by means of tape recordings; study of idiomatic and colloquial expressions; orientation in the American way of life and in university procedure.

**101. Beginning French. (3-0). Credit 3. I**
Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**102. Beginning French. (3-0). Credit 3. II**
Continuation of Modern Language 101 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice.

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*On leave of absence.

**103. Beginning German. (3-0). Credit 3. I, II**

Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**104. Beginning German. (3-0). Credit 3. II, S**

Continuation of Modern Language 103 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice.

**105. Beginning Spanish. (3-0). Credit 3. I, II, S**

For students who have had no previous training in Spanish. Study of standard elementary grammar with oral and reading exercises; early attention given to background for conversation. Part of preparation will be done in language laboratory. On completion of course the student should have a 500-word active vocabulary; he should be capable of simple conversation.

**106. Beginning Spanish. (3-0). Credit 3. I, II, S**

Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course the student should have an active vocabulary of 900 words and passive vocabulary of about 1300. Part of preparation will be done in language laboratory.

**109. Beginning Russian. (3-0). Credit 3. I**

Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. Language laboratory available for collateral training.

**110. Beginning Russian. (3-0). Credit 3. II**

Continuation of Modern Language 109; continued study of elements of grammar; oral exercises designed to develop conversational ability; continued use of oral-aural laboratory equipment.

**201. Intermediate French. (3-0). Credit 3. I**

Introduction to French readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 102 or equivalent.

**202. Intermediate French. (3-0). Credit 3. II**

Continuation of Modern Language 201 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.)

**203. Intermediate German. (3-0). Credit 3. I**

Introduction to German readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 104 or equivalent.

**204. Intermediate German. (3-0). Credit 3. II**

Continuation of Modern Language 203 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.)

**205. Intermediate Spanish. (3-0). Credit 3. I, II**

Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Language laboratory available for collateral training. Prerequisite: Modern Language 106 or two years of high school Spanish.

**206. Intermediate Spanish. (3-0). Credit 3. I, II**

Continuation of Modern Language 205. Reading of standard literary works on the 2,000-word level. Extensive written and oral work, translation and original, aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have the basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text.

**209. Intermediate Russian. (3-0). Credit 3. I**

Review of grammar; selected readings based on everyday subjects; supplementary material to develop self-expression and recognition ability. Prerequisite: Modern Language 110 or two admission units in Russian.

**210. Intermediate Russian. (3-0). Credit 3. I**

Continuation of Modern Language 209. Readings in technical and literary texts.

**305. Modern Spanish-American Drama. (3-0). Credit 3. I**

A study of representative plays by such Spanish-American dramatists as Florencio Sanchez, Martinez Cuitiño, Bustillo Oro, Rodolfo, Usigli, and others. (The dramatists studied will vary depending on their contribution to the Spanish-American theater.) An effort is made to obtain an understanding of the economic, social, and cultural background of the Spanish-American republics. The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**306. Modern Spanish-American Drama. (3-0). Credit 3. II**

Continuation of Modern Language 305. However, the authors and plays studied will differ from those offered in Modern Language 305. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**325. Public Speaking in Spanish. (1-2). Credit 2. I**

Training in the preparation and delivery of talks in Spanish. Students are required to prepare and deliver a three-minute talk in Spanish once a week, and to conduct a question-answer period of three minutes on their talk. These talks are based on subjects dealing with the student's professional field and on those dealing with Spanish-America. The talks are recorded, and individual weekly interviews are scheduled for analysis of the recording with reference to pronunciation, diction, and syntax. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**326. Public Speaking in Spanish. (1-2). Credit 2. II**

Continuation of Modern Language 325 with round-table discussions and impromptu speeches. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**335. Spanish-American Novel. (3-0). Credit 3. I**

A study of the most important works of some distinguished contemporary Spanish-American novelists. (The list will vary but will be chosen from such writers as Güiraldes, Azuela, Gallegos, Lopez y Fuentes, Guzman, Pietri, etc.) The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**336. Spanish-American Novel. (3-0). Credit 3. II**

Continuation of Modern Language 335. However, the authors and novels studied will differ from those offered in Modern Language 335. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**385. Readings in French. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of French; junior classification; approval of Head of Department.

**386. Readings in German. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of German; junior classification; approval of Head of Department.

**388. Readings in Russian. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Twelve hours of Russian; approval of Head of Department.

**401. Introduction to Scientific French. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**402. Readings in Scientific French. (1-2). Credit 2. S**

Continuation of Modern Language 401. The student will select and translate material in his major field written in French. Accuracy and skill are developed through personal conferences and checking the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 401 or approval of the Head of the Department.

**403. Introduction to Scientific German. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**404. Readings in Scientific German. (1-2). Credit 2. S**

Continuation of Modern Language 403. The student will select and translate material in his major field written in German. Accuracy and skill are developed through personal conferences and checking the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 403 or approval of the Head of the Department.

## Department of Nuclear Engineering

Professor R. G. Cochran,
Professor J. D. Randall

**401. Nuclear Engineering. (3-0). Credit 3. I** †

In this introductory course, the principles of nuclear technology are presented in a non-rigorous manner. Included are such topics as elementary nuclear physics, elementary neutron diffusion theory, homogeneous and heterogeneous reactors, and a survey of presently attractive nuclear reactor systems. Health hazards and radiation safety are briefly discussed. Prerequisites: Mathematics 210; Physics 219; senior classification.

**402. Industrial Applications of Radioisotopes.** **(3-0). Credit 3. II** †

The properties of radioactive nuclei and the interactions of radiation with matter are discussed. The behavior of radiation detection devices is covered. The properties of radioisotopes that lend themselves to industrial usage are presented and the individual applications are evaluated. Prerequisites: Mathematics 308; senior classification.

## FOR GRADUATES

**605. Nuclear Measurements Laboratory. (1-3). Credit 2. I**

The basic techniques of nuclear measurements are discussed and practiced. The behavior of neutrons in multiplying and non-multiplying media is observed. Extensive use is made of the nuclear reactor. Prerequisite: Physics 663 or registration therein.

**606. Reactor Experimentation. (2-3). Credit 3. II**

The techniques of Nuclear Engineering 605 are utilized in measuring the properties of a nuclear reactor. Control rod and power calibrations are performed. The effects of scattering, absorption, and moderation on the reactor are determined. The reactor core is disassembled and a critical experiment performed. Prerequisites: Nuclear Engineering 605; Physics 664 or registration therein.

**608. Thermonuclear Engineering. (3-0). Credit 3. II**

This course will necessarily cover material in the basic physics of mechanics, electromagnetism and nuclear phenomena. After suitable introductory preparation, the latest thermonuclear theories and machines will be discussed and analyzed. Prerequisite: Mathematics 602.

**610. Design of Nuclear Reactors. (3-0). Credit 3. II**

This course applies the fundamentals of nuclear physics and reactor theory with engineering fundamentals to the design of nuclear reactors. Prerequisites: Physics 663, 664 or registration therein.

**615. Nuclear Radiation Detection. (3-0). Credit 3. I**

The interaction of radiation with matter and the behavior of ion pairs in the presence of electric fields are discussed. The theory of operation is presented for the following radiation detection devices: ion chambers, proportional and G-M counters, scintillation detectors, Cerenkov counters, emulsions, cloud chambers, bubble chambers, and activation detectors. Prerequisite: Mathematics 307.

**618. Nuclear Control Systems. (3-0). Credit 3. II**

The fundamentals of servocontrol are developed and applied to a nuclear reactor. The safety aspects of reactor control and operational problems are discussed. Use is made of a reactor simulator in studying specific reactor control problems. Prerequisites: Physics 663, 664 or registration therein.

**621. Nuclear Metallurgy. (3-0). Credit 3. II**

The physical and metallurgical properties of metals used in nuclear reactors and the reasons for their use are considered. Prerequisite: Mechanical Engineering 409.

**622. Nuclear Power Plant Design and Analysis. (3-0). Credit 3. II**

This course is designed to present the application of nuclear reactor systems to the field of power production, utilizing the general fields of thermodynamics and heat transfer. The special problems arising from the nuclear system are given special emphasis. Prerequisites: Mechanical Engineering 323 or 328; Physics 663.

**681. Seminar. (1-0). Credit 1. I, II**

Special topics in nuclear engineering which are not covered by formal course work. Whenever possible, guest lecturers will discuss topics which they have personally investigated. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II**

This course is offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

**Physics 663. Reactor Theory. (3-0). Credit 3. I**

See Department of Physics for a full description of this course.

**Physics 664. Reactor Theory. (3-0). Credit 3. II**

See Department of Physics for a full description of this course.

## Department of Oceanography and Meteorology

Professor D. F. Leipper,
Professors J. G. Mackin, K. M. Rae, R. O. Reid, W. J. Saucier, B. W. Wilson;
Associate Professors R. G. Bader, D. W. Hood, V. E. Moyer; Assistant
Professors K. C. Brundidge, W. H. Clayton, J. D. Cochrane,
G. A. Franceschini, W. K. Henry, S. M. Ray; Instructors S. L. Barnes, J. E. McDonell

### METEOROLOGY

**317. Meteorological Instruments, Observations, and Communications. (2-3). Credit 3. I, II**

Theory, design, and accuracy of standard meteorological instruments; surface weather observations; weather codes and symbols; global and local weather networks; methods and forms of data transmission; data presentation and elementary data analysis. Prerequisites: Mathematics 120 or 209; Physics 202 or 219.

**318. Meteorological Instruments, Observations, and Communications. (1-3). Credit 2. I, II**

Methods and instruments for aerological observation, including the theory and limitations of pilot balloon, radiosonde, rawin and radar observations; computation, coding, and plotting of data. Forms of data representation; meteorological charts and diagrams; techniques of data analysis. Prerequisite: Meteorology 335.

**325. Physical Climatology. (3-0). Credit 3. I, II**

The horizontal, vertical, and seasonal distributions of meteorological elements in their relation to such basic controls as solar and terrestrial radiation, physiography, rotation of the earth, the general circulation, air mass exchange, and various atmospheric processes. Prerequisite: Physics 202 or 219.

**326. Regional Climatology. (2-0). Credit 2. II, S**

The broader climatic regimes of the earth and the physical basis for their differences; tropical and polar climatology; local climates; introduction to microclimatology. Prerequisite: Meteorology 325.

**335. Atmospheric Statics and Thermodynamics. (3-0). Credit 3. I, II**

Geopotential; chemical composition of the atmosphere; the physical variables; the hydrostatic equation; hypsometry; thermodynamics of dry, moist, and saturated air; mixing and convection; thermodynamic charts and diagrams; thermodynamics applied to atmospheric analysis and weather processes. Prerequisites: Mathematics 210; Physics 202 or 219.

**336. Atmospheric Motions. (3-3). Credit 4. I, II**

Kinematics; conservation equations; equations of motion; geostrophic and accelerated motions; streamlines; trajectories; circulation and vorticity theorem; dynamics of wind systems. Prerequisites: Mathematics 307; Meteorology 335.

**445. Atmospheric Physical Processes. (3-0). Credit 3. I, II, S** †

The physics of heat, moisture, and momentum transfer in the atmosphere; radiation, evaporation, condensation, advection, convection, turbulence, and diffusion; their consequences upon the weather. Prerequisite: Meteorology 336.

**457. Fundamentals of Weather Analysis. (1-12). Credit 5. I, II, S**

Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies of the structure and motions of air currents, fronts, cyclones, anticyclones, pressure waves, tropical storms, and other features of the circulation. Prerequisites: Meteorology 318, 336.

**458. Weather Analysis. (1-12). Credit 5. I, II, S** †

A continuation of Meteorology 457, but with the emphasis on motions of wind and weather patterns and on weather sequence. Introduction to principles and methods of prognosis and weather forecasting. Prerequisites: Meteorology 445, 457.

**465. Agricultural Meteorology. (2-0). Credit 2. II** †

Study of principles of meteorology as they are related to agriculture, with special emphasis upon the climate of the surface layers of the atmosphere. Prerequisite: Approval of the instructor.

## FOR GRADUATES

**600. Survey of Meteorology and Oceanography. (3-0). Credit 3. S**

A survey course in meteorology and oceanography designed for teachers of secondary school science. Prerequisite: Approval of Heads of Departments of Oceanography and Meteorology and of Education and Psychology.

**636. Dynamic Meteorology. (3-0). Credit 3. I**

A formal treatment of the principles of fluid dynamics as they apply to the atmosphere; the Navier-Stokes equations; perturbation theory, energy equations and transformations, vorticity, barotropic and baroclinic systems, cyclone theories, and numerical weather prediction. Prerequisites: Mathematics 601; Meteorology 336; or the equivalent. (To be offered in 1960-61 and in alternate years thereafter.)

**646. Atmospheric Physics. (3-0). Credit 3. I, S**

Fog, cloud, and precipitation physics; thunderstorms; atmospheric electricity; optical and acoustical phenomena; turbidity; the structure and exploration of the higher atmosphere; atmospheres of other planets. Prerequisite: Meteorology 445.

**647. Meteorology of the Upper Atmosphere. (3-0). Credit 3. I**

Study of the composition, structure, and characteristic phenomena of the extratropospheric terrestrial atmosphere based on balloon rocket, artificial satellite, and various indirect measurements. Prerequisite: Bachelor of Science degree in science or engineering.

**648. Cosmic Meteorology. (3-0). Credit 3. II**

Continuation of Meteorology 647. Examination of the properties and processes of the atmospheres of the other planets: composition, structure, clouds, and circulations, and their implications in terrestrial meteorology. Prerequisite: Meteorology 647.

**658. Weather Analysis. (2-6). Credit 4. I**

Discussion, application, and critical evaluation of methods employed by American and foreign centers for analyzing and forecasting circulation and weather patterns over periods up to 3 days; objective analysis and numerical prediction; recent developments; techniques for analysis of specific weather patterns. Prerequisites: Meteorology 457 or the equivalent; approval of Head of Department.

**665. Micrometeorology. (3-0). Credit 3. II**

A study of the physical processes occurring at the interface between earth and atmosphere, with special emphasis upon evaporation, turbulent diffusion of gases, variations in wind, temperature, and humidity in the lowest few meters of the atmosphere. Prerequisites: Mathematics 308; Meteorology 445; Physics 301.

**675. Radar Meteorology. (3-0). Credit 3. I, II**

Study of the theory and practice of radar storm observations. Prerequisites: Meteorology 445, 457.

**676. Hydrometeorology. (3-0). Credit 3. II**

The role of weather and weather processes in land water problems. Prerequisite: Meteorology 326 or approval of the instructor.

**679. Military Applications of Meteorology. (3-0). Credit 3. I, S**

Applications of meteorological knowledge and data to related activities and problems in the national defense not under security classification. Prerequisite: Meteorology 457.

**681. Seminar. (2-0). Credit 2. II**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## OCEANOGRAPHY

**201. Sea and Air Sciences. (1-0). Credit 1. I, II, S**

Oceanography and meteorology as scientific career fields. Features of the natural environment which affect man's daily life and activities. A survey course open to all college students.

**401. Introduction to Oceanography. (3-0). Credit 3. I, II, S** †

The various aspects of oceanography with emphasis upon those pertinent in the Gulf of Mexico. The principles upon which the disciplines of the subject are based. The unity of the marine sciences and their importance to man. The relations between oceanography and the fields of biology, chemistry, engineering, geography, geology, mathematics, meteorology, and physics. Opportunities in oceanography. Prerequisite: Senior classification in engineering or in a biological or physical science or the approval of the instructor.

### FOR GRADUATES

**601. Research Methods in Oceanography. (1-0). Credit 1. I, II, S**

Selection of a research problem for thesis work; planning the program of investigation. Prerequisites: General prerequisites for oceanography.

**603. Sea Laboratory Techniques. (0-6). Credit 2. II**

Practice in techniques used regularly aboard ship and in collecting field data. Cruise planning, navigational methods, collection of hydrographic, bathymetric and meteorological data, sediment sampling, biological sampling, and the collection of water samples for chemical analysis will be stressed. Prerequisites: General prerequisites for oceanography.

**610. Physical Oceanography. (3-0). Credit 3. I, II**

Survey of the physics of the sea; physical properties, transmission of light and sound in the sea, sea ice; heat budget of the sea and transformation of energy within the sea and at the boundaries; evaporation from the sea, description of water masses and their origin; the horizontal and vertical circulation of the seas; the applied dynamic and kinematic formulas for circulation in the sea; the concept of dynamic equilibrium of the different concentrations within the sea; introduction to waves and tides of the sea. Prerequisites: General prerequisites for oceanography.

**611. Theoretical Physical Oceanography. (3-0). Credit 3. II**

Theoretical and quantitative aspects; equations of motion; equation of continuity; boundary conditions; distribution of properties in the presence of diffusion; heat budget; stability; dynamics and computation of ocean currents; wind currents; turbulence; friction; work at sea. Prerequisites: Mathematics 601 or registration therein; Oceanography 610.

**612. Theory of Ocean Waves. (3-0). Credit 3. II**

Generation and decay of waves in deep water; modification of waves and swell in shallow water; longshore currents and rip currents; wave action on structures. Prerequisites: Mathematics 308; Oceanography 610.

**613. Engineering Aspects of Oceanography. (3-0). Credit 3. I**

Review of practical information gained from oceanography research, including information on ocean waves, currents, sea level changes, and on physical, chemical, and biological parameters from an engineering point of view; application of this knowledge to such engineering problems as the maintenance of harbors, marine structures and ships, together with a discussion of related strategic operations at sea; marine instrumentation. Prerequisites: Oceanography 610, 612.

**614. Dynamics of the Ocean and Atmosphere. (3-0). Credit 3. I**

Advanced theory of the ocean dynamics, a comparison of the hydrodynamic and thermodynamic character of the ocean and the atmosphere; the mutual dependence of the dynamics and thermodynamics of the sea on those of the air and vice versa; some special theories from the mean equations of motion, gradient wind, jet stream, mutual adjustment of the mass field and velocity field in the sea; mutually coupled temperature variations of the sea and the air; wind driven currents; the general hydrodynamic problem of the ocean and of the atmosphere, and an investigation of its uniqueness; the maintenance of the general circulation. Prerequisites: Mathematics 602; Oceanography 611. (Offered in 1959-60 and in alternate years thereafter.)

**620. Biological Oceanography. (3-0). Credit 3. II**

Critical study of important contributions defining major biological divisions, provinces, and life zones of the oceans; effects of climate, chemical, and physical barriers, and phylogeny on zoogeography; factors relating to population cycles; productivity problems; ecological inter-relationships of major groups of plants and animals in the sea. Prerequisites: General prerequisites for oceanography.

**621. Biological Oceanography of the Gulf of Mexico. (1-6). Credit 3. I**

Detailed examination of selected aspects of biological oceanography which are of major importance to the Gulf of Mexico. Prerequisites: Oceanography 620, undergraduate major in biology, or approval of instructor.

**630. Geological Oceanography. (3-0). Credit 3. II**

Topography and characteristic features of the ocean bottom; marine shorelines and processes operating in the coastal zone; nature of marine sediments; marine transportation and deposition of sedimentary materials; erosion of beaches. Prerequisites: General prerequisites for oceanography.

**631. Geological Oceanography of the Gulf of Mexico. (2-3). Credit 3. I**

Topography, stratigraphy, paleontology, and environments of the Gulf; littoral region and adjacent plains; forces acting on shorelines and bottoms; depositional surfaces, equilibria, equilibrium structures; tectonics; pleistocene history of region. Field trips. Prerequisites: Oceanography 630; undergraduate major in geology.

**640. Chemical Oceanography. (3-0). Credit 3. II**

The chemical composition and properties of sea water; the definition and calculation of salinity; the pH, excess base, and carbon dioxide system in the sea; nutrients, their cycles and their distribution; oxygen and other dissolved gases; chemistry of sedimentation; composition of organisms and organic constituents of sea water; marine corrosion; extraction of raw materials from the sea. Prerequisites: General prerequisites for oceanography.

**641. Chemical Oceanography. (3-0). Credit 3. I**

Detailed study of selected topics in chemical oceanography which pertain to the Gulf of Mexico; industrial utilization of sea water and chemical products obtained from marine plants and animals; water freshening; industrial corrosion problems; chemical aspects of photosynthesis and fertility of the sea; chemistry of estuarine waters. Prerequisites: Oceanography 640; undergraduate major in chemistry; approval of the instructor.

**642. Laboratory Techniques in Oceanography. (0-6). Credit 2. I**

Detailed study will be made of methods of preparation and analysis of samples for biological, chemical, and geological investigations. The methods of analysis will concern oxygen, phosphate, silicate, nitrate, nitrite, salinity, carbon, sediment particle size, mineralogy, organic production, and others. Prerequisites: Oceanography 603, 610, 620, 630, 640, or approval of the instructor.

**643. Geochemistry of the Ocean. (3-0). Credit 3. I**

Geochemistry of the oceanic hydrosphere, biosphere, and lithosphere; how these are related to the atmosphere; study of the elements within them. Prerequisites: Oceanography 630, 640, and 641 or graduate classification in geology. (Offered in 1959-60 and in alternate years thereafter.)

**644. Geochemistry of the Ocean. (3-0). Credit 3. II**

A detailed critical study of the geochemistry of sedimentation, the geochemical evolution of the ocean, the biogeochemistry of calcium carbonate and isotope geochemistry as related to the ocean. Prerequisite: Oceanography 643.

**651. Meteorological Oceanography. (1-3). Credit 2. I**

The use of the conservative characteristics of the sea in forecasting meteorological and oceanographic phenomena. Calculation of ocean waves and swell, transformation of waves in shallow water, preparation of wave refraction diagrams and statistical summaries, modification of air masses in contact with the ocean, forecasting of fog and squalls, effect of the oceans upon climate of the world, meteorological tides. Prerequisite: Oceanography 610.

**652. Ocean Boundary Layer Problems. (3-0). Credit 3. I**

Theory of radiative exchange of energy at the sea surface; theory of turbulent flow over hydrodynamically rough and smooth surfaces with application to the evaluation of the fluid frictional stresses at the boundaries of the sea, the evaluation of wind stress, evaporation, etc.; the micro-structure of temperature and salinity near the ocean surface; evaluation of turbulent exchange coefficients. Prerequisite: Oceanography 611. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (2-0). Credit 2. I**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in oceanography to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum. An example of the solution of a special problem in oceanography would be the work done in analyzing a special set of data collected on a cruise at sea. The course may also consist of a special series of problem discussions not given periodically, such as those offered by visiting scientists. Prerequisites: Oceanography 610, 630, 640.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## Department of Petroleum Engineering

Professor R. L. Whiting,
Professors J. W. Amyx, R. B. Bossler, J. C. Calhoun, Jr., H. T. Kennedy;
Associate Professors D. M. Bass, Jr., J. R. Pedigo, R. E. Wainerdi

**300. Petroleum Engineering Field Problems. (1-6). Credit 3. S**

A field study of the problems encountered in oil and gas fields. Course consists primarily of visits to oil and gas fields. The requirements of this course will not permit a student to take any other course at the same time. Prerequisite: Completion of junior petroleum engineering courses.

NOTE: This course may be taken in place of field work as required of all graduates in petroleum engineering. Field work for this course required before registration in any of the senior or fifth year petroleum engineering courses.

**305. Petroleum Development. (2-0). Credit 2. I**

Principles of oil field development, rotary and cable tool drilling methods, drilling fluids, oil field hydrology. Prerequisites: Geology 201, 207; Mathematics 307; Physics 219.

**306. Reservoir Rock Properties. (2-0). Credit 2. II**

A systematic study of the physical properties of petroleum reservoir rocks with particular emphasis on porosity, permeability, relative permeability, capillary characteristics, homogeneous and heterogeneous rock systems. Prerequisites: Petroleum Engineering 305, 307.

**307. Petroleum Development Laboratory. (0-3). Credit 1. I**

Properties of petroleum; operation of rotary drilling rig; well surveying practices; tests on drilling fluids and cements. Prerequisite: Petroleum Engineering 305 or registration therein.

**308. Rock and Fluid Properties Laboratory. (0-3). Credit 1. II**

Core analysis, capillary pressure and relative permeability tests, fluid displacement tests; differential and flash vaporization tests of gas saturated crude oil at elevated pressure and temperature. Prerequisites: Petroleum Engineering 306, 310, or registration therein.

**310. Reservoir Fluids. (2-0). Credit 2. II**

Thermodynamic behavior of natural occurring hydrocarbon mixtures. Evaluation and correlation of physical properties of petroleum reservoir fluids, laboratory and empirical methods. Prerequisites: Chemistry 323; Petroleum Engineering 305, 307.

**312. Well Logging. (1-0). Credit 1. II**

A preliminary study of logging methods with particular attention to electric logging and radioactive logging as they would be applied in the petroleum industry. Prerequisite: Geology 210.

**402. Petroleum Property Management. (3-0). Credit 3. II** †

Factors which influence the value of oil and gas properties; preparation of valuation reports, cost data, operating organization, regulation of petroleum production. Prerequisites: Petroleum Engineering 409, 413, 428.

**405. Drilling and Production Design. (2-2). Credit 3. I** †

A study of the selection of drilling and production equipment used in oil field practice. Design of drilling and production systems. Prerequisites: Civil Engineering 305; Petroleum Engineering 305, 306, 307, 308, 310, 312.

**409. Subsurface Engineering. (1-3). Credit 2. I** †

Well logging, contour maps, isopachous maps, and the determination of the size, shape, and volume content of petroleum reservoirs. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**413. Petroleum Measurement and Transportation. (2-2). Credit 3. I** †

Theory and methods of gas and liquid measurements and transportation including mixed streams, horizontal and vertical flow, etc. Prerequisites: Mechanical Engineering 346; Petroeum Engineering 310.

**414. Petroleum Production Engineering. (2-0). Credit 2. II** †

Gas lift, surface separation and treatment of oil field fluids. The measurement, sampling and testing of crude oil, tank strapping and preparation of tank tables, oil storage, the prevention of loss by evaporation, fire and lightning protection. Prerequisites: Petroleum Engineering 405, 413.

**415. Measurements Laboratory. (0-3). Credit 1. I** †

Methods of metering petroleum and natural gas. Study of flow of liquid gas and mixtures of gas and liquid. Advanced study of properties of petroleum at elevated pressure and temperature. Prerequisite: Petroleum Engineering 413 or registration therein.

**416. Oil Measurements and Transportation Laboratory. (0-3). Credit 1. II** †

Gauging practices, treating of oil-water emulsion, heat and sulphur content of petroleum and its products, determination of viscosity, gravity water content, carbon residue, and the coefficient of expansion of petroleum. Determination of vapor pressure of natural gasoline. Distillation of crude oil and gasoline. Methods of metering petroleum. Water analysis. Prerequisite: Petroleum Engineering 414 or registration therein.

**419. Drilling Fluids. (0-3). Credit 1. II** †

A laboratory course in which field technique and control of mud fluids to facilitate drilling are taught. Prerequisites: Senior classification in petroleum engineering; approval of the Head of the Department.

**428. Reservoir Engineering. (2-0). Credit 2. I** †

Material balance methods, including identification of type of reservoir mechanism, future production under primary recovery and gas injection; water influx calculations. Prerequisites: Petroleum Engineering 306, 308, 310.

**429. Reservoir Mechanics Laboratory. (0-3). Credit 1. I** †

A laboratory course to supplement the theory of Petroleum Engineering 428. Advanced core analysis; fundamental tests of PVT properties of petroleum at reservoir conditions. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310.

**438. Reservoir Engineering. (2-0). Credit 2. II** †

Continuation of Petroleum Engineering 428. Displacement of oil by extraneous fluids, evaluation of performance of combination drive reservoirs, sweep efficiency. Prerequisite: Petroleum Engineering 428.

**481. Petroleum Engineering Seminar. (0-2). Credit 1. I** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**482. Petroleum Engineering Seminar. (0-2). Credit 1. II** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

### FOR GRADUATES

**601, 602. Drilling and Completing Wells. (3-3). Credit 4 each semester.** S

An advanced study of the problems encountered in the drilling and completing of oil and gas wells. Prerequisite: Approval of Head of Department.

**603, 604. Advanced Reservoir Engineering. (3-3). Credit 4 each semester. I, II**

An advanced course in petroleum production practices, with special reference to the fundamental principles of flow of reservoir fluids. Prerequisite: Approval of Head of Department.

**605. Phase Behavior of Petroleum Reservoir Fluids. Credit 2 to 4 each semester. I**

A study of the pressure, volume, temperature, composition relationships of petroleum reservoir fluids. Prerequisite: Approval of Head of Department.

**607. Recovery Methods. Credit 2 to 4 each semester. II**

A study of methods of increasing recovery of petroleum from petroleum reservoirs. Prerequisite: Approval of Head of Department.

**608. Well Logging Methods. (2-3). Credit 3. II**

An advanced study of well logging methods for determining the nature and fluid content of formations penetrated by the drill. Prerequisite: Approval of Head of Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A study and presentation of papers on recent developments in reservoir mechanics. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II**

A course offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Advanced work on some special problem within the field of petroleum engineering. A thesis course. Prerequisite: Approval of the Head of the Department.

## Department of Physics

Professor J. G. Potter*,
Professors J. B. Coon, Melvin Eisner, E. G. Smith, E. E. Vezey*, D. F. Weekes;
Associate Professors P. W. Barker, C. H. Bernard, B. B. Boriskie, J. S. Ham;
Assistant Professors C. M. Loyd, R. W. Mitchell, R. K. Russell, F. C.
Whitmore; Instructors R. E. Budwine, W. G. Cantrell, J. P. Decker,
G. S. Harmon, A. E. Hoffman, C. E. Jones, N. R. Rao, R. E. Smith

Students who present for transfer courses in college physics of less credit value than the required courses in this college may validate their transfer work and receive credit in physics by examination if they wish to do so.

Normally, however, students transferring with from 8 to 10 hours of physics into curricula requiring 12 hours should register for Physics 220.

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*On leave of absence.

**201. College Physics. (3-3). Credit 4. I, II, S**

An elementary course with material selected especially with reference to the needs of premedical and predental students and students of architecture and education. Fundamentals of classical mechanics, heat, and sound. Prerequisite: Mathematics 103.

**202. College Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

**211. A Brief Survey of Physics. (3-3). Credit 4. II**

A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 101 or 110.

**213. Physics for Students of Agriculture. (2-2). Credit 3. I, II**

A brief course emphasizing fundamentals of special importance to students of agriculture in the fields of mechanics, heat, light, and electricity. Prerequisite: Mathematics 101.

**215. Introductory Physics. (2-3). Credit 3. I**

A course for pre-veterinary medicine students restricted to those topics in physics of importance to all students of veterinary medicine. The material of the first semester is in the fields of mechanics, heat, and sound. Laboratory exercises emphasize measurements, concepts, and the experimental basis of physics. Prerequisites: Mathematics 101, 103.

**216. Introductory Physics. (2-3). Credit 3. II**

A continuation of Physics 215. The material of the second semester is in the fields of light, magnetism and electricity, and atomic, molecular, and nuclear phenomena. Prerequisite: Physics 215.

**218. Mechanics and Heat. (3-3). Credit 4. I, II, S**

A comprehensive course for students of engineering and the physical sciences, providing the background for many of the engineering courses as well as for other physics courses. Cultivation of the capacity to utilize the fundamental concepts in the solution of problems is emphasized. Mechanics, heat. Prerequisite: Mathematics 120 or 209 or registration therein.

**219. Sound, Light, Electricity. (3-3). Credit 4. I, II, S**

A continuation of Physics 218. Sound, light, electricity. Prerequisite: Physics 218.

**220. Modern Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 218 and 219. Atomic physics, nuclear physics, and solid state physics. Prerequisites: Mathematics 210; Physics 219.

**301. Heat. (3-3). Credit 4. I** †

Heat transfer, specific heats, development of thermodynamic concepts introducing statistical mechanics and kinetic theory, phase and change of state, and radiation. Prerequisites: Mathematics 210; Physics 220.

**302. Mechanical Properties of Matter. (2-3). Credit 3. II** †

Rotational inertia, simple harmonic motion of translation and rotation, Kater's pendulum, gravitational fields and potential theory, gyroscopic motion, elasticity of beams, torsion, theory of elasticity, elasticity of fluids, surface tension and its application to the optimum shape for pressure vessels, diffusion, units and dimensions. Special attention is given to the setting up of equations representing physical facts, the interpretation of their solutions, and the determination of the limitations imposed by each approximation and assumption. Prerequisites: Mathematics 308 or registration therein; Physics 220.

**310. Applications of Modern Physics. (2-2). Credit 3. II**

A comparatively non-technical survey of modern applications of atomic and nuclear phenomena of interest to students of geology, biochemistry, genetics, biology, engineering, and especially premedical and predental students. Electrons, ions, isotopes, spectra, x-rays, atomic structure, radioactivity, atomic particles, nuclear accelerators, induced radioactivity, radioactive tracers, nuclear reactors, and atomic energy. Some demonstration laboratory work will accompany certain phases of the course. Prerequisites: Chemistry 101; Physics 202, 216, or 219.

**311. Atomic and Nuclear Physics. (3-0). Credit 3. I** †

An introduction to the particles of modern physics, quantum theory, relativity, atomic structure, spectra, the periodic table, photoelectricity, thermionic emission, electrical phenomena in gases, x-rays, natural and induced radioactivity, nuclear structure and phenomena, the various means of transmutation, accelerating equipment, radiation measurements, pair and meson production, cosmic ray phenomena, nuclear forces, nuclear fission, nuclear reactor operation, isotope tracer techniques, and atomic energy. Prerequisites: Mathematics 210; Physics 220.

**312. Atomic and Nuclear Physics. (2-0). Credit 2.* II** †

An extension of Physics 311 to more specialized phases of molecular, atomic, and nuclear phenomena, in so far as they may be treated without special mathematical methods and quantum mechanics. Prerequisite: Physics 311.

**314. Survey of Astronomy. (3-0). Credit 3. I**

A study of the solar system, meteors, asteroids, comets, stars, clusters, nebulae, Kepler's laws, laws of gravitation, astronomical instruments. Occasional evening meetings will be held for observation. Prerequisites: Mathematics 101, 103.

**317. Celestial Mechanics. (4-0). Credit 4. I** †

A mathematical formulation of the principles of celestial mechanics, central forces, potentials and attractions of bodies, the problem of two bodies, the problem of three bodies, the problem of n bodies. Prerequisites: Mathematics 210; Physics 201 or 218.

**322. Intermediate College Physics. (4-6). Credit 6. S**

A course for high school and junior high school science teachers and elementary science supervisors designed to fortify their preparation to a level where they can pursue upper division specialized physics courses. A review of classical physics and a brief introduction to modern physics. Prerequisite: At least six hours of credit in college physics.

**323. Topics in Electricity and Electronics. (2-3). Credit 3. S**

Topics will be treated which high school and junior high school science teachers and elementary science supervisors will be able to pursue in the instruction in their schools. Prerequisites: Mathematics 210; Physics 322.

**401. Optics. (3-3). Credit 4. I** †

A systematic treatment of physical and geometrical optics, applications to optical instruments. Prerequisites: Mathematics 210; Physics 220.

**405. Physical Mechanics. (3-0). Credit 3. I** †

A comprehensive formulation of the principles of mechanics, employing the calculus and vectorial methods. Orbital motion, Coriolis acceleration, motion of rigid bodies, vibrations. Prerequisites: Mathematics 405 or registration therein; Physics 302 or the equivalent.

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*Becomes (2-3), credit 3, effective February 1, 1962.

**411. Experimental Modern Physics. (0-6). Credit 2. II** †

Selected practical topics of atomic and nuclear physics are pursued to the point where measurements and investigations are conducted in the laboratory. Prerequisite: Physics 311.

**413. Electricity and Magnetism. (2-3). Credit 3. I, II** †

DC and AC circuit theory, thermal and chemical electromotive forces, electrical instruments, electron emission. Prerequisites: Mathematics 308; Physics 219.

**414. Electricity and Magnetism. (1-3). Credit 2. II** †

Non-linear circuits, functions of tubes in electrical circuits, electronic circuits and circuit elements for physical measurements. Prerequisite: Physics 413 or approval of the instructor.

**416. Electromagnetic Fields. (3-0). Credit 3. II** †

Electric and magnetic field theory with emphasis on vector analysis and culminating in an introduction to electromagnetic radiation; properties of dielectrics and magnetic materials. Prerequisites: Mathematics 405 or 601; Physics 413 or approval of the instructor.

**418. Theoretical Physics. (3-0). Credit 3. II** †

An introduction to theoretical physics with emphasis on fundamental concepts and general principles. Prerequisites: Mathematics 307; Physics 219.

**420. Introduction to Astrophysics. (3-0). Credit 3. II** †

An introduction to the theory and application of astrophysics. The physics of the sun's core, the internal structure of stars, spectroscopic and dynamic aspects of stellar atmospheres, radiation from the sun and stars, interstellar matter, the origin and evolution of planetary atmospheres. Prerequisites: Mathematics 307 or registration therein; Physics 220, 314.

**421. Celestial Mechanics. (3-0). Credit 3. II** †

A continuation of Physics 317. The laws of binary star systems, the determination of orbits, perturbations of the moon, general perturbations, the problem of satellites. Prerequisite: Physics 317.

## FOR GRADUATES

**600. Physics for Secondary School Teachers. (2-3). Credit 3.** S

This course taught by members of the Physics faculty will aim to develop convictions concerning the fundamental principles of classical and modern physics which should be taught in a course in high school physics and to develop techniques and methods of preparing and conducting demonstrations and laboratory exercises. Prerequisites: Graduate classification; approval of the Heads of the Education and Physics Departments.

**601. Analytical Mechanics. (4-0). Credit 4. I, S**

Dynamics of particles and of rigid bodies, gyrodynamics, potential theory, Hamilton's principle, principle of least action, Lagrange's equations, and the Hamilton-Jacobi equation, with applications. Prerequisites: Mathematics 405 or 601; Physics 405.

**602. Fluid Mechanics and Elasticity. (4-0). Credit 4. II**

Mechanics of continuous media. Foundations of elasticity with application to theory of beams, plates, and shells. Hydrodynamics of viscous and nonviscous fluids. Supersonic flow and shock wave propagation. Boundary layer theory. Lubrication theory. Prerequisite: Physics 601 or the equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**603. Electromagnetic Theory. (4-0). Credit 4. II, S**

Theory of electromagnetism; static and time-varying fields; progagation, reflection, and refraction of electromagnetic waves. Prerequisites: Mathematics 601 or the equivalent; Physics 416 or the equivalent.

**605. Thermodynamics. (4-0). Credit 4. II, S**

The fundamentals of classical thermodynamics, including the first and second laws, thermodynamic potentials, conditions for equilibrium, properties of gases; thermodynamics of electromagnetic systems, and a brief treatment of kinetic theory including Maxwell's velocity distribution law, viscosity, and diffusion. Prerequisites: Mathematics 308; Physics 301 or the equivalent.

**607. Statistical Mechanics. (4-0). Credit 4. I**

Fundamentals of classical and quantum statistical methods and their application to physical systems. The statistical basis of entropy; the specific heats of gases and crystals; electronic phenomena in metals; super-fluidity; black-body radiation; and other applications to atomic and nuclear physics. Prerequisite: Approval of the instructor.

**611. Advanced Optics. (4-0). Credit 4. I, S**

The electromagnetic theory of optical phenomena in discontinuous, isotropic, and anisotropic media. Prerequisite: Physics 603. (Offered in 1960-61 and in alternate years thereafter.)

**612. Atomic Structure. (3-0). Credit 3. I, S**

A study of the atom and atomic spectra from the quantum mechanical viewpoint including the hydrogen atom, perturbation method, complex atoms, transition probabilities, angular momentum operators, multiplet structure of energy levels, fine structure and electron spin. Prerequisites: Mathematics 308 or the equivalent; Physics 311.

**614. Molecular Structure. (4-0). Credit 4. II**

The quantum mechanical theory of valence; the hydrogen molecule ion, molecular orbitals for diatomic molecules; the hydrogen molecule; coulombic and exchange integrals; Pauli exclusion principle and the covalent bond; hybrid atomic orbitals; general molecular orbital method. Prerequisite: Physics 612. (Offered in 1960-61 and in alternate years thereafter.)

**617. Physics of the Solid State. (3-0). Credit 3. II**

A study of the electrical, magnetic, thermal, and mechanical properties of crystalline solids. Lattice energy of ionic crystals, lattice vibrations, dielectric phenomena, luminescence and phosphorescence, electron theory of metals, band theory, semi-conductors, low temperature behavior of solids. Prerequisite: Approval of the instructor.

**618. Nuclear Theory. (3-0). Credit 3. I**

Application of quantum mechanics to nuclear phenomena. Prerequisites: Physics 623, 625, or the equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**623. Quantum Mechanics. (4-0). Credit 4. I, S**

Foundations of quantum mechanics; theories of Heisenberg and De Broglie with applications especially to nuclear physics. Prerequisites: Mathematics 602 or the equivalent; Physics 601, 612, 625.

**624. Quantum Mechanics. (4-0). Credit 4. II**

A continuation of Physics 623. A postulational development of the foundations of quantum mechanics; classical foundations, Hamiltonian formalism, canonical transformations, representation and expansion theory, relativistic-quantum mechanics, quantum electrodynamics, quantum field theory, fundamental particles, meson field theories, and high energy phenomena. Prerequisite: Physics 623. (Offered in 1960-61 and in alternate years thereafter.)

**625. Nuclear Structure. (3-0). Credit 3. II, S**

Properties of fundamental particles; theory of simple nuclear models; scattering, spins, magnetic moments and cross sections; alpha, beta, and gamma decay; detection, measurement, and production of nuclear particles; nuclear spectroscopy; interactions of nuclear radiations with matter; nuclear reactions; high energy nuclear phenomena. Prerequisites: Mathematics 308, 601; Physics 312 or the equivalent.

**627. Relativity. (3-0). Credit 3. I**

Special relativity and its application to covariant formulation of mechanics and electrodynamics. Theory of general relativity including development of necessary tensor calculus and non-Euclidean geometry. Predictions of general relativity and experimental tests of theory; cosmological problems and unified field theories. Prerequisites: Physics 601, 603. (Offered in 1960-61 and in alternate years thereafter.)

**631. Quantum Theory of Solids. (3-0). Credit 3. II**

Development of solid state theory from the basic theory of quantum mechanics. Theory of perfect and imperfect crystal lattices. Interaction of electromagnetic radiation with non-conducting crystals. Electrons in perfect crystal lattices. Theory of metallic cohesion. Transport phenomena. Electric and magnetic properties of solids. Semiconductors, superconductors, superfluids. Prerequisite: Physics 617.

**633. Experimental Physics. (0-3). Credit 1. I, II, S**

Experiments in atomic, nuclear, and solid state physics, designed to complement theory courses in these fields and to prepare the student for experimental research in physics. Prerequisite: Graduate classification.

**661. Radiological Physics. (3-0). Credit 3. II**

Interaction of radiation with matter, health physics and radiation protection, reactor sources of radiation, shield design. Prerequisites: Mathematics 308; Nuclear Engineering 401 or Physics 312.

**663. Reactor Theory. (3-0). Credit 3. I**

Mathematical theory of the diffusion and slowing down of neutrons in the homogeneous nuclear reactor without reflector and with reflector. Prerequisites: Mathematics 308, 601 or registration therein; Physics 312.

**664. Reactor Theory. (3-0). Credit 3. II**

A continuation of Physics 663. The steady state and transient behavior of the heterogeneous reactor. Theory of reactor control. Special mathematical methods in reactor analysis. Extensive problem work to illustrate the applications of the theory. Prerequisites: Mathematics 602 or registration therein; Physics 663.

**665. Theory of Accelerators. (3-0). Credit 3. II**

Description and classification of accelerators. Cockcraft-Walton accelerators, electrostatic generators; linear accelerators; theory of magnetic focusing; cyclotron; theory of electrostatic focusing; stability conditions, betatron; synchrocyclotron; synchrotron; low energy pulse devices; energy measurement and control; instrumentation and technique; reactions; radiological safety. Prerequisites: Mathematics 307; Physics 312.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems not related to thesis.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Plant Physiology and Pathology

Professor W. C. Hall,
Professors H. E. Joham, D. W. Rosberg, G. M. Watkins; Associate Professors L. S. Bird, W. W. Heck, W. H. Thames, Jr.; Assistant Professors L. J. Ashworth, Jr., M. C. Futrell, S. P. Johnson*, C. S. Miller

**301. Plant Pathology. (2-3). Credit 3. I**

An introduction to the fundamental principles of plant pathology, including diagnosis, cause, and control of plant diseases. Prerequisites: Biology 101, 206.

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*On leave of absence.

**302. Plant Disease Diagnosis. (0-3). Credit 1. II**

A practice course designed to give the student experience in diagnosing plant disease problems. All categories of plant diseases will be studied. Prerequisite: Plant Physiology and Pathology 301 or approval of the instructor.

**313. Introduction to Plant Physiology. (2-3). Credit 3. I**

A general course dealing with the principal life processes of the higher plants, with particular emphasis on the influence of environmental factors on the processes and development of crop plants. Prerequisites: Biology 101; Chemistry 102.

**314. Principles of Plant Physiology. (3-3). Credit 4. II** †

A more advanced and detailed study of the physiology of green plants than Plant Physiology and Pathology 313, with emphasis on nitrogen metabolism, respiration, mineral nutrition, photosynthesis, and growth. Prerequisites: Chemistry 231; Physics 213; Plant Physiology and Pathology 313.

## FOR GRADUATES

**605. Plant Metabolism. (2-0). Credit 2. II**

Photosynthesis and respiration are discussed in detail, including the history and recent developments in these fields. Prerequisite: Plant Physiology and Pathology 314, or Biochemistry and Nutrition 601 and approval of instructor. (Offered in 1959-60 and in alternate years thereafter.)

**607. Physiology of the Fungi. (3-0). Credit 3. II**

A general course in the physiological activities of fungi, including growth and development, mineral nutrition, carbon and vitamin nutrition, the chemistry of metabolic products, fungicides, and the physiology of parasitism and resistance. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1959-60 and in alternate years thereafter.)

**609. Quantitative Plant Physiology. (2-6). Credit 4. II**

Methods employed in the various types of physiological investigations and the interpretation of results obtained by them. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1959-60 and in alternate years thereafter.)

**611. Plant Nutrition. (3-0). Credit 3. II**

This course deals with the inorganic nutrition of plants. It includes solute absorption, accumulation and translocation; growth of plants in artificial media; physiological roles of various elements in the plant, and biochemical problems associated with salt absorption. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**612. Phytohormones and Plant Growth Regulators. (3-0). Credit 3. I**

This course includes material on the classification, properties, and action of naturally occurring plant hormones as well as a discussion of the synthetic growth regulators. Material is included on practical application and uses of phytohormones and growth regulators. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**613. Plant Growth and Development. (3-0). Credit 3. I**

A course dealing with the growth, differentiation, and development of higher plants. A comprehensive study of vernalization and photoperiodism is included as well as a discussion of the influences of water relations, mineral nutrition, and hormones on the developmental cycle. Consideration is also given to differentiation within the plant as related to such qualities as winter hardiness and drought resistance. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**616. Methods in Plant Pathology. (2-6). Credit 4. II**

A presentation of the methods by which plant diseases are identified and investigated. Emphasis is placed on preparation for research work in plant pathology. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**617. Parasitism in Plant Disease. (3-3). Credit 4. II**

A critical presentation of the literature on the invasion of plant tissues by parasitic bacteria, fungi, and nematodes. Mechanisms of host defense are examined. Processes are illustrated in the laboratory through the study of histological preparations and by experimentation. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1960-61 and in alternate years thereafter.)

**618. Bacterial Plant Diseases. (2-3). Credit 3. II**

A detailed study of bacterial diseases of fruit and vegetable crops, field crops and ornamental plants, with special emphasis upon the nature of the disease, dissemination of the pathogen and methods of control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**620. Plant Viruses. (2-0). Credit 2. I**

Lecture presentation and discussion of the nature and properties of plant viruses. Methods of virus transmission, host plant reactions to viruses, serological reactions, and methods of purification of viruses for examination under the electron microscope, and the study of economically important plant virus diseases and their control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**621. Plant Parasitic Nematodes. (2-3). Credit 3. I**

The morphology, identification, and biology of plant parasitic nematodes; the damage they cause; methods of control. Non-plant-pathogenic nematodes commonly found in the soil will be studied also. Prerequisite: Approval of the instructor.

**622. Plant Nematology. (1-6). Credit 3. II**

Advanced study of the principal groups of plant parasitic nematodes, with emphasis on methods used in research. Prerequisite: Plant Physiology and Pathology 621. (Offered in 1960-61 and in alternate years thereafter.)

**623. Diseases of Field Crops. (2-3). Credit 3. I**

An intensive study of both the fundamental and the practical aspects of the more important and representative diseases of field crops. The plant disease problems peculiar to extensive cultivation methods will be stressed. Prerequisite: Plant Physiology and Pathology 301.

**624. Diseases of Fruits, Vegetables, and Ornamentals. (2-3). Credit 3. II**

Identification and control of the important diseases of fruit, vegetable, and ornamental crops in Texas. Consideration will also be given to diseases of major berry crops and pecans. Various diseases and types of decay affecting products in shipment and storage will be studied. Each student will be required to carry out an inoculation-isolation exercise employing a bacterial or fungus pathogen. A virus inoculation exercise will be done by students working in pairs. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1959-60 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Reports and discussions of topics of current interest in plant physiology and plant pathology, including reviews of literature on selected subjects.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or dissertation. Prerequisite: Plant Physiology and Pathology 314 or the equivalent (for physiology), 301 or the equivalent (for pathology).

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigation in support of thesis or dissertation.

**Biochemistry and Nutrition 601. Biochemistry of Plants. (3-0). Credit 3. I**

See Department of Biochemistry and Nutrition for a full description of this course.

## Department of Poultry Science

Professor J. H. Quisenberry,
Professors J. R. Couch, W. F. Krueger, E. D. Parnell; Associate Professor
T. M. Ferguson; Assistant Professors R. L. Atkinson, R. E.
Davies, R. C. Fanguy, F. A. Gardner, C. B. Ryan

**201. Poultry Production. (2-2). Credit 3. I, II**

The breeds and types of poultry, culling poultry for egg production, incubation, brooding and feeding for growth and egg production, winter and summer management, housing and hygiene, preparing poultry for market, methods of marketing, practical application of these subjects to farm conditions. The practice consists of the identification of breeds and varieties, judging poultry for egg production, plans for poultry farms and poultry houses, identification of feeds, and formulation of poultry rations.

**303. Turkey Production. (2-0). Credit 2. II**

Varieties of turkeys; breeding practices with turkeys; management and feeding of turkeys; incubation practices with turkeys; management of poults from hatching to market; special turkey marketing practices; sanitation and disease prevention with turkeys.

**308. Hatchery Management. (2-3). Credit 3. II**

Commercial hatching in America, early commercial hatcheries, expansion, types of hatchery enterprise, related activities, localization of hatchery business, how and where to start, hatchery building, inside arrangement, ventilation, heat and temperature control, hatchery equipment, types of incubators; hatchery flock improvement, study of the National Poultry and Turkey Improvement Plans, sanitation, incubation practices, prices and hatchery costs. Trends in size of hatcheries and causes. Practice consists of culling and blood testing hatchery flocks, setting eggs in incubator, fumigating and disinfecting incubator, candling hatching eggs, pedigreeing and judging baby chicks.

**309. Broiler Production. (2-2). Credit 3. I**

A study of modern commercial broiler production including type of birds required for successful broiler operation; the importance of such factors as color of plumage, body conformation, rate of growth, feathering, livability, uniformity and feed efficiency; housing and equipment requirements for brooding, advantages of different brooding and management systems; disease hazards; a study of cost factors such as feed, chick, labor, medication, and overhead; methods of marketing broilers; methods of financing broiler operations; integration in the broiler industry. Practice involves the design, setting up and conducting broiler tests for evaluation of modern strains, feeds, and management practices. At the end of the tests the birds will be graded, dressed, and production costs calculated.

**401. Management and Selection. (1-2). Credit 2. II** †

How to select breeding males and females; culling the farm flock; planning a poultry program for a community with emphasis on good management and soundness of health; how to plan and manage county poultry shows. A thorough study of the National Poultry Improvement Plans, with enough practice work in selecting and testing to qualify students for official Plan participation.

**403. Judging. (2-2). Credit 3. I**

The judging of standard breeds and varieties; special instructions for judges; methods of fitting and showing birds; types of shows and show management; a study of standard disqualifications and their application to various selection standards; grading of live and dressed market poultry, and of market eggs. Practice work consists of judging classes for production and for market quality. Several small poultry shows will be judged, and visits made to egg and poultry processing plants and farms of poultry breeders.

**407. Technology and Marketing of Poultry and Poultry Products. (2-2). Credit 3. I**

A study of the U.S.D.A. grades of eggs, and of live and dressed poultry; preparing poultry for market—killing, dressing, chilling, and packaging; candling, grading, and packing shell eggs; drying and freezing eggs; storage problems and techniques with special emphasis on maintenance of quality during storage; planning poultry and egg plant layouts with special emphasis on meeting U.S.D.A. requirements for sanitation; a study of commercial egg and poultry plants and their operation; newer developments in packaging and merchandising poultry and eggs; effects of feed upon quality and quality retention; a careful study of regulations governing the grading and inspection of poultry of the U. S. Department of Agriculture, with special emphasis on inspection for wholesomeness. Prerequisite: Poultry Science 201.

**411. Poultry Feeding. (3-2). Credit 4. I** †

The history of poultry nutrition, a short study of the chemical composition of carbohydrates, proteins, fats, vitamins, and mineral mixtures as found in poultry feeds. Composition, functions, sources, and care of vitamins commonly required for efficient poultry feeding. A study of the nutritive value of the different grains, roughages, mill feeds, and protein concentrates used in poultry nutrition. Practice work in the analysis of feedstuffs, the formulation of poultry rations, and diagnosis of lack of essentials in poultry rations. Prerequisites: Chemistry 223, 231.

**414. Poultry Breeding. (2-2). Credit 3. I** †

The basic principles of poultry breeding. The inheritance of characters of economic importance. The records essential for a sound breeding program; the selection of breeders on the basis of records and standard bred characteristics. Practice includes taking records on the breeding birds, interpreting the records, and the techniques involved in pedigree breeding. Prerequisite: Genetics 301.

**481. Poultry Seminar. (1-0). Credit 1. I**

Extensive review of the literature on poultry problems. The student will be required to prepare and present to the class comprehensive reviews of the literature on various phases of poultry science. Each student will be assigned a certain number of technical journals for current reporting to the seminar group. Prerequisite: Senior classification.

**482. Poultry Seminar. (1-0). Credit 1. II**

Continuation of Poultry Science 481.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

A directed study of a selected problem not covered by other courses in the Department of Poultry Science. The content of the course would be adapted to the interest and needs of the students. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**603. Principles and Practices of Incubation. (3-3). Credit 4. II**

A study of the developmental stages of the chick during incubation. Correlation of development with genetic and environmental factors. Study of the fundamental principles underlying successful artificial incubation of eggs. Relation of egg characters to hatchability. Effects of pre-incubation treatment on hatchability of chicken and turkey eggs. Control of disease during the incubation process. Relation of maternal diet to embryonic development and hatchability of the chick. Prerequisite: Poultry Science 308 or equivalent.

**604. Principles of Brooding and Rearing. (3-3). Credit 4. I**

A study of principles involved in brooding poultry. Relative cost and efficiency of different brooding and rearing methods. Relation of brooding practice to growth, livability, and subsequent adult performance. Such factors as diet, levels of protein, minerals, vitamins, medicants and growth stimulants are analyzed in relation to growth, livability, malformations, and feed efficiency. Physiological factors such as temperature control mechanisms and hormones are covered. Research methodology and thorough literature review are stressed. Prerequisites: Poultry Science 201 and 303 or equivalent.

**609. Avian Physiology. (3-3). Credit 4. I**

A study of basic physiological principles pertaining specifically to the avian species. The chicken will be used as the laboratory animal. The vascular, digestive, neural, respiratory and reproductive systems will be stressed. Prerequisites: Biology 433; approval of instructor.

**611. Poultry Processing, Storing, and Distribution. (3-0). Credit 3. II**

A study of egg quality and of egg quality maintenance. Effects of storage on egg and meat quality. The latest methods of processing eggs and poultry; feeding of market birds to improve grade; costs of production for various areas, and for various sized flocks and methods of management; planning optimum sized units for economical production. Prerequisites: Agricultural Economics 314 or equivalent; Poultry Science 407 or the equivalent.

**612. Laboratory Problems in Poultry Processing, Storing, and Distribution. (0-3). Credit 1. II**

A survey of improved methods of processing poultry and eggs. Certain selected modern processing plants will be visited and a study made of operating methods. Students may assist with experimental work in progress on poultry and egg processing and storage. Laboratory comparisons of various methods of fattening and their effects on market and storage quality of fowl. Effects of temperature and methods of dressing on market and storage quality. Prerequisite: Poultry Science 611 or registration therein.

**613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

An advanced and specialized study of poultry breeding and genetics covering such areas as causation, interrelations among traits, effective size of populations, methods of measuring genetic improvement, the heterosis concept, measures of general and specific combinability, and genetic homeostasis. Efficiency of various systems of breeding poultry will be analyzed. Scientific journals and technical literature will be reviewed. Prerequisites: Genetics 301 and Poultry Science 414 or the equivalent.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Intensive review and reporting of literature on poultry feeding, breeding, incubation, marketing, and management problems. Development of familiarity not only with literature but with organizations, agencies, and personnel working with poultry problems. Prerequisite: Graduate classification. May be repeated as many semesters as desired but maximum of two credits allowed toward Master's degree.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

An intensive study of newer principles and methods in the various specialized fields of poultry science—breeding, nutrition, market technology. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Intensive study of research methods and techniques in poultry breeding, nutrition, physiology, physical aspects of marketing, or poultry products technology. Students will be required to carry out some experimental projects in one of these fields. Reviews of specific literature, collection, analysis, and presentation of experimental data will be stressed. Designed for thesis credit.

## Department of Range and Forestry

Professor R. A. Darrow,
Professor O. E. Sperry; Associate Professors F. W. Gould, R. R. Rhodes;
Assistant Professors D. L. Huss, W. G. McCulley, W. J. Waldrip

**102. Introduction to Range and Forestry. (1-0). Credit 1. II**

A brief survey of the fields of forestry and range management including the history, resources, policies, organization, industries, employment, education and research pertaining to the respective professions. One field trip into the forest is required.

**202. Range Plants. (2-3). Credit 3. I**

Native forage plants of the ranges of the United States. Determination, distribution, ecology, and economic value, especially in Texas are considered. Poisonous plants and range practices to avoid livestock losses are included. Prerequisite: Biology 102 or the equivalent.

**203. Dendrology. (1-3). Credit 2. I**

The identification, classification, group silvical characteristics, distribution, and values of the important trees and shrubs of the coniferous group (Gymnosperms). Field trips arranged. Prerequisite: Biology 102.

**204. Dendrology. (2-3). Credit 3. II**

The identification, classification, group silvical characteristics, distribution, and values of the important trees of the hardwood group (Angiosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Field trips arranged. Prerequisite: Biology 102.

**301. Plant and Range Ecology. (2-3). Credit 3. II** †

An analysis of habitat factors as they influence plant growth. Attention is given plant succession, competition and distribution of plants in relation to the environment. Prerequisite: Biology 102.

**303. Agrostology. (2-3). Credit 3. I** †

A fundamental study of grasses, especially those of economic importance in Texas. A study of the characteristics of the various genera and species of grasses, their identification, distribution, propagation, improvement, and management with particular reference to their use and value in Texas ranges and pastures. Prerequisite: Biology 102 or equivalent.

**304. Range Management. (2-3). Credit 3. I** †

A technical course dealing with problems met in managing native range lands, including a study of grazing regions, and the problems of each; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock management as it affects vegetation. Field trips. Prerequisites: Range and Forestry 301, 303.

**308. Farm Forestry. (2-3). Credit 3. II**

Management of farm woodlands and woodlots for the production of fuel, posts, and merchantable products; seasoning, preservation, and use of wood products; windbreak and shelterbelt planting forestry in relation to grazing and economics of agriculture. Field trips.

**309. Silvics and Silviculture. (2-3). Credit 3. I**

A study of the factors of site, their influence on tree growth and reciprocal effect on site; silvicultural cutting systems, cultural operations, and the silvicultural characteristics of the more important commercial species of the South and Southwest. Field trips. Prerequisite: Range and Forestry 308.

**310. Forest Products and Utilization. (2-2). Credit 3. II**

Utilization of the products of farm woodlots, woodlands, and commercial forests; the manufacture and utilization of lumber, timber, and other wooden products, including mechanical properties, and lumber grades. Also the identification of certain woods important in agricultural and commercial enterprises of the South and Southwest. Field trips.

**401. Range Improvement and Maintenance. (2-3). Credit 3. I, II**

A general course for students not majoring in range management. Native forage and poisonous plants on the ranges of Texas. Evaluation and analysis of range lands, grazing systems, livestock handling, problems, physiology of plant responses to grazing and range management, range condition classification. Field trips.

**409. Advanced Range Management. (2-3). Credit 3. II** †

A technical course dealing with the more advanced problems in managing native range lands. Special attention will be given to the study of the development of the range industry, cost of production, range land utilization, grazing systems, and condition classes. Field trips. Prerequisite: Range and Forestry 304.

**411. Field Range Management. Credit 2 or 3. S** †

A semi-technical summer field course in which emphasis is placed upon identification of important range plants; determination of vegetation types, subtypes, forage utilization values, range condition classes, mapping; brush eradication and control, and proper distribution of livestock. A summer field course primarily for county agricultural agents and vocational agricultural teachers, others by approval of instructor.

**412. Range Management Practices. (2-3). Credit 3. I, II**

Livestock management as related to utilization of range lands; range and ranch management planning; evaluation and survey of forage resource; economic principles associated with range livestock management. Prerequisite: Range and Forestry 304 or 401.

**485. Range Problems. Credit 1 to 3 each semester. I, II, S** †

Individual study and research upon a selected range problem approved by instructor.

## FOR GRADUATES

**605. Range Research Methods. Credit 2. I**

A study of research methods in range management and related subjects. A review of scientific investigation in the field and analysis of results. Prerequisite: Graduate majors in range and forestry.

**606. Range Economics. (2-0). Credit 2. II**

Range management practices, land utilization, and ranch operation as they affect economics of livestock industry and the nation. Prerequisite: Graduate majors and minors in range and forestry.

**607. Vegetation Influences. (3-0). Credit 3. I**

Interrelationships between ecological factors and vegetation, influence of forest and range vegetation on watershed management and soil conservation. Prerequisite: Range and Forestry 301. (Offered in 1959-60 and in alternate years thereafter.)

**609. Plant and Range Ecology. (3-0). Credit 3. II**

A detailed study of plant communities, successions, and the effect of various degrees of utilization in vegetation types and edaphic factors. Prerequisite: Range and Forestry 301 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**610. Range Grasses and Grasslands. (2-3). Credit 3. II**

A study of range grasses as applied to utilization and sustained production. The ecological characteristics and geographical features of the native grasslands. Ecological principles as applied to range problems. Individual problems to be assigned. Prerequisites: Range and Forestry 301, 303; approval of Head of Department.

**611. Control of Noxious Range Plants. (3-0). Credit 3. I**

An advanced study of native and naturalized noxious and poisonous plants on Texas ranges that are detrimental to good management practices. Their distribution, reproduction, dissemination, and methods and practices of control will be stressed in relation to conservation and economic importance. Field trips to be arranged. (Offered in 1960-61 and in alternate years thereafter.)

**612. Range Management Practices, Policies, and Administration. (3-0). Credit 3. I**

Advanced studies dealing with technical range management problems, social and economic background of legislation, and policies developed in the acquisition and administration of national, state, and private range properties. Field trips to be arranged. Prerequisite: Range and Forestry 409 or equivalent. (Offered in 1959-60 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Current scientific work in range management and related subjects in American and foreign fields. Prerequisite: Majors and minors in range and forestry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed for investigations not included in the student's research for thesis or dissertation. Problems may be selected in applied ecology, range management, or forestry. Lectures, conferences, field work, reports. Prerequisite: Graduate majors or minors in range and forestry.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation. Prerequisite: Graduate major in range and forestry.

## Religious Education

(See page 75)

## Department of Veterinary Anatomy

Professor J. H. Milliff;
Associate Professors L. W. Gibbs, A. G. Kemler

**301. Anatomy. (0-9). Credit 3. I** ‡

The osteology, dentition, and arthrology of the domestic animals and topographical dissection of the dog.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**302. Anatomy. (0-9). Credit 3. II** ‡

Topographical dissection of the cow and a comparative study of the horse, cat, and pig. Prerequisite: Veterinary Anatomy 301.

**303. Histology. (2-6). Credit 4. I** ‡

A microscopic study of the basic tissues and of the organs, excluding the organs of reproduction.

**304. Embryology. (3-3). Credit 4. II** ‡

A microscopic study of the reproductive organs of the domestic animals, and of serial sections of chick and pig embryos. Prerequisites: Veterinary Anatomy 301, 303.

**306. Neuroanatomy. (0-6). Credit 2. II** ‡

Gross, developmental, and microscopic anatomy of the nervous system. Prerequisite: Veterinary Anatomy 303.

**501. Surgical Anatomy. (0-6). Credit 2. I** †

The anatomy of the areas of surgical and clinical importance in the domestic animals. Prerequisite: Veterinary Anatomy 302.

## FOR GRADUATES

**601. Veterinary Anatomy. (1-9). Credit 4 each semester. I, II**

The topographical dissection of domestic animals. Prerequisites: Veterinary Anatomy 301, 302.

**602. Veterinary Anatomy. (2-6). Credit 4. I, II**

The microscopic structure of the anatomical systems of domestic animals. Prerequisite: Veterinary Anatomy 303.

**603. Neuroanatomy. (2-6). Credit 4. II**

The study of the gross, developmental, and microscopic anatomy of the nervous systems of the domestic animals. Prerequisite: Veterinary Anatomy 306.

**604. History of Anatomy. (1-0). Credit 1. I, II, S**

A discussion of the biographies and contributions to the field of anatomy of the most important anatomists from 500 B.C. to the present. Prerequisite: Graduate major in veterinary anatomy.

**681. Seminar. (1-0). Credit 1. S**

The review and discussion of current scientific work in anatomy and related subjects. Prerequisite: Graduate major or minor in veterinary anatomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Problems in either gross or microscopic anatomy along lines to be chosen by the individual. Prerequisites: Veterinary Anatomy 306; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on a selected thesis problem in anatomy. Prerequisite: Graduate major in veterinary anatomy.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

## Department of Veterinary Medicine and Surgery

Professor M. R. Calliham,
Professors W. C. Banks, R. J. Beamer, H. E. Redmond; Associate Professor J. C. Ramge; Assistant Professors J. H. Denton, E. W. Ellett, W. M. Romane; Instructors B. M. Cooley, G. M. Gowing, H. B. Naylor*, J. F. Neal; Lecturers I. B. Boughton, A. A. Price

**416. General Surgery. (1-0). Credit 1. II**

Principles of unsoundnesses and horseshoeing. Prerequisite: Veterinary Anatomy 302.

**511. Non-Infectious Diseases of Large Animals. (3-0). Credit 3. I**

Lectures and demonstrations on physical diagnosis; diseases of the digestive, circulatory, respiratory, urinary organs; nervous system; and the skin of large animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**512. Radiology. (2-0). Credit 2. II**

Fundamentals of veterinary radiography, fluoroscopy, x-ray, and radioisotope therapy with interpretation of radiographs and fluoroscopic examinations and essential protection from radiation. Prerequisites: Veterinary Microbiology 436; Veterinary Pathology 444.

**513. Non-Infectious Diseases of Small Animals. (3-0). Credit 3. I**

Non-infectious and nutritional diseases, obstetrics, pediatrics, and geriatrics of small animals, fur-bearing animals, and laboratory animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**514. Infectious Diseases of Small Animals. (2-0). Credit 2. II**

A study of the bacterial, rickettsial, viral, and protozoan diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 513.

**515. General Surgery. (4-0). Credit 4. I**

The principles of dentistry, surgery, and anesthesia of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Medicine and Surgery 416.

**516. Operative Surgery of Large Animals. (2-2). Credit 3. II**

Surgical diseases and special surgery of large animals. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**519. Clinics. (0-4). Credit 1. I**

Clinical orientation, restraint, administration of medicine, physical examination, methods of collecting specimens for laboratory purposes. Prerequisites: Veterinary Medicine and Surgery 513 and 515 or registration therein.

**520. Clinical Seminar. (0-4). Credit 1. II**

Presentation and discussion of clinical cases. Prerequisite: Veterinary Medicine and Surgery 519.

**521. Reproductive Diseases. (2-0). Credit 2. II**

A consideration of prevention and treatment of diseases incident to or affecting breeding, conception, gestation, parturition, and postparturient convalescence of common domestic animals; prevention and treatment of diseases of the newborn. Prerequisite: Veterinary Medicine and Surgery 526.

**524. Operative Surgery of Small Animals. (1-2). Credit 2. II**

Surgical procedures in small animals, including orthopedics. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

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*On leave of absence.

**526. Obstetrics. (2-0). Credit 2. I**

Castration and spaying of farm animals, physiology of parturition, mechanics of obstetrical operations; theory and technique of artificial insemination. Prerequisite: Veterinary Physiology and Pharmacology 529 or registration therein.

**561. Clinical Laboratory Diagnosis. (0-2). Credit 1. I** †

Instruction in routine laboratory procedures including hematology, urine analysis, radiography, and radiation therapy. Prerequisites: Veterinary Medicine and Surgery 520; Veterinary Microbiology 436.

**562. Clinical Laboratory Diagnosis. (0-2). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 561. Prerequisite: Veterinary Medicine and Surgery 561.

**563. Ambulatory Clinic. (0-4). Credit 1. I**

Under the supervision of an instructor, students are taken on calls to private farms or College herds for training and experience in the diagnosis and treatment of animal diseases under actual farm and ranch conditions. Prerequisite: Veterinary Medicine and Surgery 520.

**564. Ambulatory Clinic. (0-4). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 563. Prerequisite: Veterinary Medicine and Surgery 563.

**565. Large Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. All species of large animals are utilized. Lectures on hospital management and large animal practice and promotion are included. Prerequisite: Veterinary Medicine and Surgery 520.

**566. Large Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 565. Prerequisite: Veterinary Medicine and Surgery 565.

**567. Small Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. Detailed studies of hospital planning, practice management, and promotion and veterinary ethics are included. Prerequisite: Veterinary Medicine and Surgery 520.

**568. Small Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 567. Prerequisite: Veterinary Medicine and Surgery 567.

**569. Veterinary Clinics. (0-6). Credit 2. S**

Veterinary clinics. Prerequisite: Veterinary Medicine and Surgery 520.

## FOR GRADUATES

**603. Veterinary Surgery. Credit 1 to 8 each semester. I, II**

Special surgery of large or small animals. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**685. Problems. Credit 1 to 8 each semester. I, II**

Original investigations of problems in the field of surgery, therapeutics, or radiology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis.

## Department of Veterinary Microbiology

Professor L. C. Grumbles;
Associate Professors A. I. Flowers, C. F. Hall; Assistant Professors P. F. Jungerman, R. W. Moore

**334. Poultry Diseases. (2-2). Credit 3. II**

Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic, and contagious diseases. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323.

**435. Microbiology and Immunology. (3-4). Credit 4. I** ‡

The principles of microbiology and immunology. Emphasis is placed on the general morphology, physiology, and immunologic reactions of microorganisms important in veterinary medicine. Special attention is given to the biologics in the diagnosis and treatment of infectious diseases. Prerequisite: Second year classification in veterinary medicine.

**436. Pathogenic Microbiology. (3-3). Credit 4. II** ‡

A study of the general staining procedures, cultural methods and media preparation for bacteria; and the morphology, cultural characteristics, and pathogenicity of microorganisms which produce diseases in domestic animals and man. Prerequisite: Veterinary Microbiology 435.

**485. Problems. Credit 1 to 3. I, II, S**

A directed, individual study of a selected problem in veterinary microbiology approved by the instructor. Prerequisite: Approval of the Head of the Department.

**595. Poultry Diseases. (2-2). Credit 3. I**

The pathology of diseases of poultry will be considered from clinical, pathological, microbiological, and parasitological standpoints. Prevention, control, and treatment will also be given consideration. Prerequisite: Senior classification in veterinary medicine.

**596. Poultry Diagnosis. (0-2). Credit 1. II**

Clinical laboratory diagnosis of poultry diseases. Prerequisite: Veterinary Microbiology 595.

### FOR GRADUATES

**643. Veterinary Microbiology. (3-4). Credit 4. I, II**

A study of the pathogenic microorganisms; their cultural and biological characteristics and pathogenicity.

**646. Avian Virus Diseases. Credit 1 to 4. I, II**

A study of the viral diseases of poultry including methods of isolation and identification of the causative agents. Practice consists of conducting post mortem examinations and special diagnostic procedures on birds received daily for necropsy. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**647. Veterinary Virology. Credit 1 to 4. I, II**

A detailed study of virus infections in animals, including types of infections, mode of transmission, intracellular pathology, epidemiology, isolation and identification of the inciting agents. Practice includes tissue cultivation, animal inoculations, and diagnostic tests. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Veterinary Mycology. Credit 1 to 4. II, S**

A study of actinomycetes, yeasts, and molds that are pathogenic to man and animals; the morphology, cultural characteristics, pathogenicity and identification. Practice consists of exercises in cultural methods, morphological characteristics, biochemical reactions and diagnosis. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in microbiology. Prerequisite: Degree of Doctor of Veterinary Medicine. (May be taken for undergraduate credit with permission of the Head of the Department.)

**691. Research. Credit 1 to 8. I, II**

An original problem in veterinary microbiology. This research to be reported by a thesis as partial requirement for the Master of Science degree. Prerequisite: Admission to candidacy for Master of Science degree.

## Department of Veterinary Parasitology

Professor R. D. Turk;
Associate Professor R. R. Bell; Instructor T. J. Galvin

**483. Parasites of Domestic Animals. (2-2). Credit 3. I** ‡

Internal parasites of domestic animals. Symptoms, diagnosis, treatment, control, and eradication of parasitic diseases are emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized. Prerequisite: Veterinary Anatomy 302.

**484. Parasites of Domestic Animals. (2-2). Credit 3. II** ‡

Internal parasites of farm, pet, and fur-bearing animals. Attention is given to symptoms, diagnosis, treatment, control, and eradication of parasitic diseases. Practice consists of laboratory and diagnostic methods used in parasitology; the pathology of parasitism. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized in the laboratory. Prerequisite: Veterinary Parasitology 483.

**487. Parasites of Farm Animals and Poultry. (2-2). Credit 3. II, S** †

A study of some of the more important internal and external parasites of domestic animals and poultry. The life cycles, pathogenicity, and economic and public health aspects will be stressed with suggested methods for control. Open to agricultural students. Prerequisite: Senior classification.

**583. Clinical Parasitology. (0-2). Credit 1. I**

Diagnosis of parasitic diseases is emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Prerequisite: Veterinary Parasitology 484.

**584. Clinical Parasitology. (0-2). Credit 1. II**

Diagnosis of parasitic diseases including physical examination of patients and such laboratory procedures as are indicated. Prerequisite: Veterinary Medicine and Surgery 519.

### FOR GRADUATES

**601. Parasitology. Credit 1 to 4 each semester. I**

A detailed study of the more important helminth parasites of domestic animals, including their identification, distribution, and life history. Prerequisite: Veterinary Parasitology 584 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Special problems concerned with the parasites of domestic animals or poultry. Prerequisites: Veterinary Parasitology 601 or the equivalent; approval of the instructor.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

## Department of Veterinary Pathology

Professor H. A. Smith,
Professors I. B. Boughton, C. H. Bridges; Associate Professor J. N.
Beasley; Instructor F. A. Fear

**443. General Pathology. (4-3). Credit 5. I**

The elementary disease processes and their causes, including a study of the gross and minute appearance of the diseased tissue. Such processes as inflammation, necrosis, gangrene, atrophy, hypertrophy, ulceration, the various degenerations, infiltrations, pigmentations, and tumor formations are considered. Practice consists of the microscopic study of these processes and instruction in laboratory technique. Prerequisites: Veterinary Anatomy 302, 304.

**444. Special Pathology. (5-3). Credit 6. II**

Lectures on special pathology of organs and systems. Infectious and noninfectious diseases are considered. The mechanism of development of lesions and their relationship to clinical symptoms are emphasized. Lectures are illustrated liberally with color slides. Laboratory work consists of studies in gross and microscopic pathology. Prerequisite: Veterinary Pathology 443.

**447. General Principles of Pathology. (2-2). Credit 3. I, S** †

A study of the mechanisms of disease as encountered in the higher mammalian species. The course deals with the causes and pathogenesis of the various types of disease, the reactions of the body against them, and certain abstract principles governing their treatment. Open to non-medical students. Lectures and demonstrations. Prerequisites: Six hours of biological sciences; junior classification.

**577. Applied Pathology. (0-2). Credit 1. I**

Pathology as directly applied to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**578. Applied Pathology. (0-2). Credit 1. II**

Pathology as applied directly to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**585. Problems in Pathology. Credit 1 to 4 each semester. I, II, S**

An elective course for undergraduates who wish to supplement the standard required courses. Problems can be assigned in gross or microscopic pathology or in pathological technique. Prerequisites: Veterinary Pathology 443; approval of the instructor.

### FOR GRADUATES

**643. Gross Pathology. Credit 1 to 6. I, II, S**

The student studies gross pathological changes at the necropsies performed daily. He then follows selected tissues through suitable histopathological techniques and corrects his gross diagnosis in the light of the microscopic findings. Confirmatory bacterologic methods are utilized where indicated. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**644. Locomotor and Skeletal Diseases. Credit 1 or 2. I, S**

The changes taking place in diseased bones, joints, and muscles are studied with respect to their nature and probable causes, and with special reference to lameness of the horse. Frequent use is made of the unsurpassed Mark Francis Collection of Bone and Joint Pathology. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**645. Neoplastic Diseases. Credit 1 to 8. I, II, S**

Theoretical, histopathological, and clinical aspects of neoplasms. Diagnosis of neoplastic and related conditions in all species. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**646. Nutritional Diseases. Credit 2 to 4. II**

Gross and microscopic tissue changes to be found in experimentally produced nutritional deficiencies are considered in comparison with clinically encountered deficiencies and with other conditions from which they must be differentiated. Prerequisite: Degree of Doctor of Veterinary Medicine or other suitable preparation.

**647. Metabolic Diseases. Credit 1 or 2. S**

The pathology of diseases due to major disorders of metabolism, non-nutritional and non-infectious. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Reproductive Diseases. Credit 1 to 4. S**

Theoretical and practical pathology of gross and microscopic lesions in the reproductive organs with especial reference to bovine sterility. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**649. Gross Post-Mortem Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in recognition, interpretation, and description of tissue changes encountered. Specific diagnoses are derived and defended. Prerequisites: At least 4 semester hours of credit in Veterinary Pathology 643.

**650. Neuropathology of Animals. Credit 1 to 4. I, S**

In addition to the study and interpretation of gross and microscopic lesions of the central and peripheral nervous systems, major attention is given in theory and in practice to the special laboratory techniques necessary to demonstrate such lesions. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**651. Microscopic Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in diagnosis, applied especially to the "problem" cases currently encountered in the Department's pathological diagnostic service. Routine and special histopathological methods are employed. Prerequisites: A total of at least 10 semester hours of credit in Veterinary Pathology 643, 645.

**658. Pathological Technique. Credit 1 to 6. I, II, S**

The art and science of preparing animal tissues, fluids, and exudates for microscopic or other special examination. Enrollment is limited to the number who can be accommodated in the routine of the departmental laboratory. Prerequisite: A fair knowledge of general chemistry.

**659. Sheep Diseases. Credit 1 to 4. I**

The pathology, etiology, and symptomatology of the economically important diseases affecting sheep in all of the major sheep-producing countries of the world. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**691. Research. Credit 1 or more each semester. I, II, S**

Research to be reported by the writing of a thesis or dissertation as a partial requirement for the Master of Science or Doctor of Philosophy degree.

## Department of Veterinary Physiology and Pharmacology

Professor P. W. Burns;
Associate Professor R. H. Davis, Jr.; Assistant Professor E. D. McMurry;
Instructor J. D. McCrady; R. O. Berry, Professor of Animal Husbandry,
Lecturer on Physiology of Reproduction

**323. Physiology of Farm Animals. (2-2). Credit 3. I, II**

A consideration of physiology and anatomy essential to an understanding of diseases of farm animals. For students in agriculture. Prerequisite: Chemistry 231.

**326. Physiology. (4-3). Credit 5. II** ‡

Introduction to physiology. Dynamics of nerve and muscle. Functions of the circulatory and respiratory systems. Renal function and body fluids. Mechanisms of digestion, absorption, and excretion. Prerequisites: Biochemistry and Nutrition 312; Veterinary Anatomy 301, 303, registration in 302, 304, 306.

**427. Physiology. (2-6). Credit 4. I** ‡

Metabolism and energy exchange. Minerals and vitamins. Functions of the nervous, endocrine, and reproductive systems. Milk secretion and growth. Prerequisite: Veterinary Physiology and Pharmacology 326.

**428. Pharmacology. (3-0). Credit 3. II**

Pharmacologic principles; central nervous system depressants and stimulants; local anesthetics; autonomic drugs; skeletal muscle relaxants; antiallergics. Prerequisite: Veterinary Physiology and Pharmacology 427.

**529. Pharmacology. (2-3). Credit 3. I**

Cardiovascular drugs; agents affecting blood formation and coagulation; blood derivatives and plasma substitutes; diuretics; locally-acting drugs; gastrointestinal agents; drugs used in metabolic disorders, hormones; local and systemic anti-infectives; parasiticides. Practice consists of the study of the actions of drugs on experimental animals. Prerequisite: Veterinary Physiology and Pharmacology 428.

**530. Toxicology. (2-2). Credit 3. II**

Occurrence, symptoms, lesions, treatment, prevention, and management of poisoning by inorganic and organic poisons. Clinical manifestations, lesions and management of animals affected by poisonous plants. Practice consists of actions and treatment of poisons in experimental animals; chemical detection of some of the more common inorganic and organic poisons. Prerequisite: Veterinary Physiology and Pharmacology 529.

**573. Pharmacy. (0-2). Credit 1. I**

Chemical, pharmaceutic, and biologic assay methods; preparing, compounding, and dispensing medicines. Prerequisite: Veterinary Physiology and Pharmacology 529.

**574. Pharmacy. (0-2). Credit 1. II**

A continuation of Veterinary Physiology and Pharmacology 573. Prerequisite: Veterinary Physiology and Pharmacology 573.

## FOR GRADUATES

**601, 602. Animal Physiology. (3-3). Credit 4 each semester. I, II**

Recent phases of physiology; modern experimental methods. The work is arranged to suit the needs of the student and in harmony with his previous training. Prerequisite: Basic courses in morphology and organic chemistry.

**605, 606. Veterinary Toxicology. (3-3). Credit 4 each semester. I, II**

Original investigations and detailed studies of poisons or poisonous plants and their effects on domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 530.

**607, 608. Veterinary Pharmacology. (3-3). Credit 4 each semester. I, II**

Modern methods of research in pharmacology and pharmaceutical processes. Original research in studying the actions and uses of drugs. Prerequisites: Veterinary Physiology and Pharmacology 428, 529.

**611, 612. Veterinary Physiology. (3-3). Credit 4 each semester. I, II**

A detailed study of specific phases of physiology of domestic animals. Prerequisites: Veterinary Anatomy 303, 304; Veterinary Physiology and Pharmacology 427.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Problems in physiology, pharmacology, or toxicology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigations in veterinary physiology, pharmacology or toxicology to be submitted by writing of a thesis as partial fulfillment for the Master of Science degree. Prerequisite: Approval of Head of Department.

## Department of Veterinary Public Health

Professor F. P. Jaggi;
Assistant Professor L. H. Russell, Jr.; I. B. Boughton, Lecturer

**491. Animal Hygiene. (2-2). Credit 3. I, II**

This course deals with livestock sanitation and the prevention, control, and eradication of diseases of farm and ranch animals. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323; senior classification in agriculture.

**533. Food Hygiene. (1-2). Credit 2. I**

The inspection of foods of animal origin with special emphasis on milk; laws, ordinances, and regulations governing animal food products including sanitary requirements and animal diseases. Prerequisite: Junior classification in veterinary medicine.

**536. Infectious Diseases of Large Animals. (5-0). Credit 5. II**

A study of the bacterial, rickettsial, viral, and protozoal diseases of farm and ranch animals (bovine, equine, ovine, caprine, and porcine). Public health aspects of the various intertransmissible diseases of animal and man are stressed. Prerequisite: Junior classification in veterinary medicine.

**591. Food Hygiene. (2-2). Credit 3. I**

A continuation of Veterinary Public Health 533 with special emphasis on meat. Required field trips. Prerequisites: Senior classification in veterinary medicine.

**592. Public Health. (2-2). Credit 3. II**

The relation of the veterinarian and veterinary problems to public health. Required field trips. Prerequisite: Veterinary Public Health 591.

### FOR GRADUATES

**601. Food Hygiene. (3-4). Credit 4. I**

The study of causes and evidence of spoilage, and the detection of adulterants in fresh, canned, and cured foods of animal origin. Prerequisite: Veterinary Public Health 591 or 592.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in veterinary public health. Prerequisite: Degree of Doctor of Veterinary Medicine.

## Department of Wildlife Management

Professor W. B. Davis;
Associate Professors R. J. Baldauf, R. B. Davis, O. C. Wallmo;
Instructor J. M. Inglis

**201. Wildlife Conservation and Management. (3-0). Credit 3. I, II**

An introduction to the wildlife and fishery resources of the United States with special reference to Texas. The importance of plants and animals in our economic and cultural life. An account of what has happened to North American wildlife with consideration of specific plans and methods for its rehabilitation, maintenance, and increase.

**202. Natural History of the Vertebrates. (2-2). Credit 3. II**

Natural history of fishes, amphibians, reptiles, birds and mammals, as exemplified by selected representatives of each group. Not open to wildlife management majors.

**300. Field Studies. Credit 3. S**

Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates; experience in collecting and preparing study skins of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Head of Department.

**304. Conservation and Management of Fishes. (3-0). Credit 3. II**

The classification, habits, economic importance, and conservation of fishes.

**311. Ichthyology. (Fresh Water). (2-3). Credit 3. I** †

This course is designed to familiarize the student with the fresh-water fishes of the world. The approach to the subject matter will be mainly systematic, but the evolution, ecology, life history, and economy of the more important species will be treated. The fresh-water fishes of Texas will be emphasized and the practice will consist of the identification of 75-100 fish. Prerequisite: Biology 107.

**312. Ichthyology. (Marine). (2-3). Credit 3. II** †

A study of the marine fishes of the world, emphasizing fishes of Texas. Life history, ecology, distribution, evolution, and economic values of important species will be treated. Prerequisite: Biology 107. (Offered in 1959-60 and in alternate years thereafter.)

**315. Herpetology. (2-2). Credit 3. II** †

An introduction to the study of the structure, adaptation, classification, distribution, and economic importance of amphibians and reptiles. Prerequisite: Biology 107.

**316. Field Herpetology. (0-3). Credit 1. II**

Field work involving the collection and preservation of herpetological specimens; natural history; ecological relations. Prerequisite: Wildlife Management 315 or registration therein.

**400. Fisheries Survey. Credit 4. S**

A field course. Attention will be given to the life histories, ecology, and propagation of fishes important for sporting and food purposes. Distribution, identification, and field techniques. Prerequisite: Junior classification or approval of Head of Department.

**401. General Mammalogy. (2-2). Credit 3. I** †

Study of the structure, classification, and economic relations of mammals. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**402. General Ornithology. (2-2). Credit 3. II** †

Introduction to the study of birds, their structure, classification, geographic distribution, ecologic relations, and economic status. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**403. Animal Ecology. (2-3). Credit 3. I** †

Composition, structure, and energy relationships of plant-animal communities. The interaction of physical and biotic factors as they affect population levels and community development. Application of ecological principles to some current land use practices. Prerequisite: Range and Forestry 301.

**408. Techniques of Wildlife Management. (2-3). Credit 3. II** †
Methods and techniques in maintaining and increasing desirable wildlife and regulating population generally, with emphasis on practical aspects. Use of natural vegetation, the place and methods of census, restocking, game preserves, predatory animal control, provision of food and cover, farmer-sportsman relations, significance of succession, and other ecologic concepts to game management and related enterprises. Prerequisite: Senior classification in wildlife management or approval of instructor.

**410. Conservation and Management of Fishes. (3-0). Credit 3. II** †
Basic knowledge from ichthyology, biology of fishes, and limnology is related to the applied aspects of fresh water and marine fishery science. Emphasis is placed on methods of fish culture, habitat and population manipulation, disease and parasites of fishes and fundamentals of farm pond management.

**417. Biology of Fishes. (2-2). Credit 3. I** †
Treats the biology of fishes, including respiration, sense organs, feeding habits, breeding habits, anatomy, and adaptations to the environment. Emphasis will be placed upon the various physiological and morphological features of fishes, particularly as they relate to problems of distribution, populations, and management in Texas. Prerequisite: Biology 107. (Offered in 1959-60 and in alternate years thereafter.)

**485. Wildlife Problems. Credit 1 to 3. I, II, S**
Individual study and research on a selected problem approved by the instructor. Prerequisite: Junior or senior classification.

## FOR GRADUATES

**601, 602. Vertebrate Systematics. (1-6). Credit 3 each semester. I, II**
The theory and practice of taxonomy as applied to vertebrates. Laboratory consists of individual problems on classification and distribution of selected groups of vertebrates; problems in nomenclature of birds, mammals, fishes and reptiles, based on Texas Cooperative Wildlife Collection. Survey of the literature of vertebrate taxonomy as related to the group selected; a study of vertebrate material from the systematic standpoint. Prerequisites: Wildlife Management 311, 315, 401, or 402, depending on group selected. (Offered in 1960-61 and in alternate years thereafter.)

**603. Vertebrate Ecology. (1-6). Credit 3. II**
The ecology and life histories of vertebrates with special reference to birds and mammals. The role of native vertebrates in relation to range, forest, and farm problems. Consideration will be given to community and environmental relations. Prerequisite: Wildlife Management 403 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**608. Techniques of Wildlife Management. (2-0). Credit 2. II**
Special techniques and current development in wildlife management practices. Prerequisite: Wildlife Management 408 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**609. Wildlife Research Methods. (2-0). Credit 2. I**
A study of research methods as applied to wildlife management. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**
Important current developments in the wildlife field with special reference to the literature. Prerequisite: Senior or graduate classification.

**685. Problems. Credit 2 to 6 each semester. I, II, S**
Credit to be adjusted in accordance with requirements of each individual case.

**691. Research. Credit 1 or more each semester. I, II, S**
Original research on selected wildlife problem to be used in thesis or dissertation.

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# Bulletin of the Agricultural and Mechanical College of Texas

## 1961-62

UNIVERSITY OF ILLINOIS
JUN 14 1962
LIBRARY

## COVER

The beautiful All Faiths Chapel is the personification of religious emphasis on the campus at the Agricultural and Mechanical College of Texas. A gift of the Association of Former Students, the Chapel affords at all hours a reflective and reverent atmosphere for individual meditation and prayer. In keeping with the aspiration of the College to fully prepare its students for all of life's experiences, the Chapel symbolizes spiritual development to all students regardless of denomination or creed.

# BULLETIN

OF THE

# AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

Sixth Series, Vol. 8 February 1, 1961 No. 1

# UNDERGRADUATE CATALOGUE ISSUE

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## ANNOUNCEMENTS FOR THE SESSION 1961-62

1876

84

COLLEGE STATION, TEXAS

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# COLLEGE
# 1961

## SUMMER SESSION 1961

### JUNE 1961

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### JULY 1961

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### AUGUST 1961

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**June 5, Monday**
Registration for the first term, 8 a.m. to 12 noon.

**June 6, Tuesday**
Beginning of classes, 7 a.m.

**June 8, Thursday**
Last day for enrolling in the College for the first term.

**July 4, Tuesday, a holiday**

**July 14, Friday**
First term final examinations.

**July 17, Monday**
Registration for the second term, 8 a.m. to 12 noon.

**July 18, Tuesday**
Beginning of classes, 7 a.m.

**July 20, Thursday**
Last day for enrolling in the College for the second term.

**August 25, Friday**
Second term final examinations.

## FALL SEMESTER 1961

### SEPTEMBER 1961

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### OCTOBER 1961

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### NOVEMBER 1961

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**September 12, Tuesday**
Arrival of entering freshmen on the campus.

**September 13-14, Wednesday-Thursday**
New Student Program.

**September 14-15, Thursday-Friday**
Registration of entering freshmen, 1 p.m. to 5 p.m., Thursday; 8 a.m. to 12 noon, Friday.

**September 15-16, Friday-Saturday**
Registration of all other students, 1 p.m. to 5 p.m., Friday; 8 a.m. to 5 p.m., Saturday.

**September 18, Monday**
Beginning of classes, 8 a.m.

**September 23, Saturday**
Last day for enrolling in the College for the fall semester or for adding new courses.

**September 27, Wednesday**
Last day for dropping courses with no grade.

**October 11-13, Wednesday-Friday, inclusive**
Texas Agricultural Experiment Station Annual Staff Conference.

**November 13, Monday**
Mid-semester grade reports.

**November 23-26, Thursday-Sunday, inclusive**
Thanksgiving holidays.

# CALENDAR
# 1962

**December 20, Wednesday**
Beginning of Christmas recess, 5 p.m.

**January 3, Wednesday**
End of Christmas recess, 8 a.m.

**January 20, Saturday**
Commencement.

**January 22, Monday**
First day of semester examinations.

**January 27, Saturday**
Last day of semester examinations.

**DECEMBER 1961**

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| 31 | | | | | | |

## SPRING SEMESTER 1962

**January 31, Wednesday**
Arrival of entering freshmen on the campus.

**February 2, Friday**
Registration of entering freshmen, 8 a.m. to 12 noon.

**February 2-3, Friday-Saturday**
Registration of all other students, 1 p.m. to 5 p.m., Friday; 8 a.m. to 5 p.m., Saturday.

**February 5, Monday**
Beginning of classes, 8 a.m.

**February 10, Saturday**
Last day for enrolling in the College for the spring semester or for adding new courses.

**February 14, Wednesday**
Last day for dropping courses with no grade.

**February 19-23, Monday-Friday, inclusive**
Religious Emphasis Week.

**March 26, Monday**
Mid-semester grade reports.

**April 18, Wednesday**
Beginning of spring recess, 5 p.m.

**April 24, Tuesday**
End of spring recess, 8 a.m.

**May 26, Saturday**
Commencement and Final Review.

**May 28, Monday**
First day of semester examinations.

**June 2, Saturday**
Last day of semester examinations.

**JANUARY 1962**

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**FEBRUARY 1962**

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**MARCH 1962**

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**APRIL 1962**

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**MAY 1962**

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## The Texas Agricultural and Mechanical College System

Composed of all colleges, agencies and services under the supervision of the Board of Directors of the Agricultural and Mechanical College of Texas, including:

- The Agricultural and Mechanical College of Texas
  - The Texas Agricultural Experiment Station
  - The Texas Agricultural Extension Service
  - The Texas Engineering Experiment Station
  - The Texas Engineering Extension Service
  - The Texas Transportation Institute
- The Arlington State College
- The Tarleton State College
- The Prairie View Agricultural and Mechanical College
- The Texas Forest Service

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| Fred J. Benson, M.S. | *Dean of Engineering* |
| Harold D. Bearden, M.A. | *Director of Engineering Extension Service* |
| Alvin A. Price, D.V.M., M.S. | *Dean of Veterinary Medicine* |
| James P. Hannigan, B.S. | *Dean of Students* |
| H. Lloyd Heaton, M.S. | *Director of Admissions and Registrar* |
| Charles A. Roeber, B.A., B.B.A. | *Business Manager* |

# FACULTY

(Correct as of February 1, 1961)

## ACADEMIC COUNCIL

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Rudder, James Earl, President of the College. (1958, 1959)

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1945)

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)

Benson, Fred Jacob, Dean of the School of Engineering. (1947, 1957)

*Bridges, Charles Hubert, Professor of Veterinary Pathology. (1955, 1960)

Brison, Fred Robert, Professor of Horticulture. (1926, 1938)

Burchard, Donald Dix, Professor of Journalism. (1948)

Burgess, Archie Rostron, Professor of Industrial Engineering. (1948, 1950)

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology. (1926, 1935)

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry. (1947, 1956)

Calaway, Paul Kenneth, Professor of Chemistry. (1957)

Calhoun, John C., Jr., Vice Chancellor for Development. (1955, 1960)

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery. (1958)

Chalk, Alfred Franklin, Professor of Economics. (1936, 1956)

Cochran, Robert Glenn, Professor of Nuclear Engineering. (1959)

Crawford, Charles William, Associate Dean of Engineering. (1919, 1957)

Cronk, Alfred Edward, Professor of Aeronautical Engineering. (1956)

Davis, Joe Eugene, Colonel, Inf., U.S.A.R., Commandant of the School of Military Sciences. (1930, 1951)

Davis, William B., Professor of Wildlife Management. (1937, 1946)

DeWerth, Adolphe Ferdinand, Professor of Floriculture. (1946, 1949)

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)

Gaines, J. C., Professor of Entomology. (1947, 1952)

Godbey, Chauncey Barger, Professor of Genetics. (1926, 1946)

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)

Groneman, Chris Harold, Professor of Industrial Education. (1940, 1942)

Grumbles, Leland Creed, Professor of Veterinary Microbiology. (1949, 1957)

Hall, Wayne C., Dean of Graduate Studies. (1949, 1960)

Hallmark, Glen Duncan, Professor of Electrical Engineering. (1942, 1957)

Hannigan, James P., Dean of Students. (1959)

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*Effective October 16, 1960.

Harrington, Marion Thomas, Chancellor. (1924, 1953-1957, 1959)

Hobgood, Price, Professor of Agricultural Engineering. (1939, 1958)

Holleman, Theo Rufus, Professor of Architecture. (1946, 1957)

Houze, Robert Alvin, Library Director. (1949, 1957)

Hubert, Frank William R., Dean of the School of Arts and Sciences. (1959)

Hutchison, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health. (1937, 1957)

Klipple, Edmund Chester, Professor of Mathematics. (1935, 1952)

Leinweber, Charles Lee, Professor of Range and Forestry. (1960)

Leipper, Dale F., Professor of Oceanography. (1949)

Leland, Thomas William, Professor of Business Administration. (1922, 1926)

Lewis, Robert Donald, Director of Texas Agricultural Experiment Station. (1946)

Lindsay, James Donald, Professor of Chemical Engineering. (1938, 1946)

Lyman, Carl M., Professor of Biochemistry and Nutrition. (1940, 1949)

Lynch, Shirley Alfred, Professor of Geology. (1946)

Lyons, Charles Roger, Director of Student Health. (1956, 1957)

Mackin, John Gilman, Professor of Biology. (1950, 1960)

Milliff, John Henry, Professor of Veterinary Anatomy. (1936, 1941)

Morgan, Stewart Samuel, Professor of English. (1921, 1952)

Myers, James Arthur, Athletic Director. (1958)

Nance, Joseph Milton, Professor of History and Government. (1941, 1958)

Parker, Grady P., Professor of Education. (1940, 1954)

Patterson, Raleigh Elwood, Dean of Agriculture. (1958, 1960)

Potter, James Gregor, Professor of Physics. (1945)

Potts, Richard Carmechial, Assistant Dean of Agriculture. (1936, 1956)

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)

Quisenberry, John Henry, Professor of Poultry Science. (1936, 1946)

Roeber, Charles Arthur, Business Manager. (1929, 1954)

Rosberg, David William, Professor of Plant Physiology and Pathology. (1950, 1960)

Rupel, Isaac Walker, Professor of Dairy Science. (1945)

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences and Professor of Geography. (1934, 1959)

Simmang, Clifford Max, Professor of Mechanical Engineering. (1938, 1957)

*Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)

Street, William Ezra, Professor of Engineering Drawing. (1941)

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*Retired October 15, 1960.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology. (1947, 1953)

Tishler, Carl Edward, Professor of Health and Physical Education. (1941, 1947)

Trogdon, William O., Professor of Agronomy. (1958)

Turk, Richard Duncan, Professor of Veterinary Parasitology. (1944)

Walton, Ernest Vernon, Professor of Agricultural Education. (1946, 1953)

Watkins, Gustav McKee, Director of Agricultural Instruction. (1949, 1960)

Whiting, Robert Louis, Professor of Petroleum Engineering. (1946, 1954)

Woolket, Joseph John, Professor of Modern Languages. (1925, 1945)

Wright, Samuel Robert, Professor of Civil Engineering. (1923, 1946)

Zinn, Bennie A., Director of the Department of Student Affairs. (1945, 1954)

## GENERAL FACULTY

(Figures in parentheses indicate date of first appointment on the College Staff and date of appointment to present position respectively.)

Abbott, John Paul, Distinguished Professor of English. (1926, 1956)
B.A., Vanderbilt, 1925; Ph.D., Iowa, 1939.

Adamson, Arthur Douglas, Professor of Health and Physical Education. (1939, 1949)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1944.

Adkins, William Gray, Associate Professor of Agricultural Economics and Sociology. (1956)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1953.

Adkisson, Perry L., Associate Professor of Entomology. (1958)
B.S., Arkansas, 1950; M.S., 1954; Ph.D., Kansas State College, 1956.

Albritton, Oscar Willard, Assistant Professor of Mechanical Engineering. (1956, 1958)
B.S., Texas College of Mines and Metallurgy, 1951; M.S., Agricultural and Mechanical College of Texas, 1958; Reg. Prof. Engr.
(On leave of absence.)

Aldred, William Hughes, Assistant Professor of Agricultural Engineering. (1953, 1957)
B.S., Georgia, 1951; M.S., Agricultural and Mechanical College of Texas, 1956.

Alexander, Robert Benjamin, Associate Professor of Chemistry. (1952, 1959)
B.A., Baylor, 1945; M.A., 1946; Ph.D., Agricultural and Mechanical College of Texas, 1957.
(On leave of absence.)

Allen, David Edward, Captain, Assistant Professor of Air Science. (1958)
B.S., United States Naval Academy, 1953.

Alter, Alan Brian, Assistant Professor of Mechanical Engineering. (1949, 1952)
B.S., Pittsburgh, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Amason, Robert Daniel, Assistant Professor of Business Administration. (1960)
B.B.A., Agricultural and Mechanical College of Texas, 1951; M.B.A., 1958.

Amyx, James William, Professor of Petroleum Engineering. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1946; M.Eng., 1956; Reg. Prof. Engr.

Anderson, John Quincy, Professor of English. (1953, 1959)
A.B., Oklahoma Agricultural and Mechanical College, 1939; M.A., Louisiana State, 1948; Ph.D., North Carolina, 1952.

Andrews, Paul Milton, Associate Professor of Health and Physical Education. (1943, 1951)
B.S., Sul Ross State Teachers College, 1934; M.Ed., Agricultural and Mechanical College of Texas, 1945.

Arango, Ergasto Ramon, Instructor in Government. (1960)
B.S., Florida, 1951; M.A., Columbia, 1954; Ph.D., Florida, 1961.

Ashcraft, Allan Coleman, Assistant Professor of History. (1956, 1960)
B.A., Agricultural and Mechanical College of Texas, 1950; M.A., Columbia, 1951.

Ashworth, Lee J., Jr., Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., California, 1951; M.S., 1954; Ph.D., 1958.

Atkins, Irvin Milburn, Agronomist (Agricultural Research Service, USDA, cooperating). (1939, 1954)
B.S., Kansas State College, 1928; M.S., 1936; Ph.D., Minnesota, 1945.

Atkinson, Robert Leon, Assistant Professor of Poultry Science. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950; Ph.D., California, 1958.

Atwater, William Felix, Captain, Assistant Professor of Air Science. (1958)
B.S., Berea College, 1949; M.A., George Peabody College for Teachers, 1950.

Axford, Roy Arthur, Associate Professor of Nuclear Engineering. (1960)
A.B., Williams College, 1950; S.B., Massachusetts Institute of Technology, 1952; S.M., 1955; Sc.D., 1958.

Bader, Richard George, Professor of Oceanography. (1955, 1960)
B.S., Maine, 1948; S.B., Chicago, 1949; M.S., 1950; Ph.D., 1952.

Bailey, Kenneth Ralph, Assistant Professor of Mathematics. (1946, 1954)
B.A., Texas, 1937; M.A., 1941.

Baldauf, Richard John, Associate Professor of Wildlife Management. (1952, 1959)
B.S., Albright College, 1949; M.S., Agricultural and Mechanical College of Texas, 1951; Ph.D., 1956.

Ball, Billie Joe, Instructor in Electrical Engineering. (1959)
B.S., Mississippi State, 1956; M.S., 1959.

Ballinger, Richard Henry, Professor of English. (1954, 1957)
B.A., Texas, 1936; M.A., 1936; Ph.D., Harvard, 1953.

Banks, William Carl, Professor of Veterinary Medicine and Surgery. (1941, 1955)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Bardell, North Bruce, Jr., Assistant Professor of Engineering Graphics. (1953, 1957)
B.S., Agricultural and Mechanical College of Texas, 1953.

Barker, Donald Gene, Assistant Professor of Psychology. (1959)
B.A., Baylor, 1952; M.A., 1954.

Barker, Palmer Winfield, Associate Professor of Physics. (1946, 1949)
B.S., Missouri, 1932; M.A., 1933.

Barnard, Herbert Marvin, Assistant Professor of Electrical Engineering. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1955.

*Barnes, Stanley Louis, Instructor in Meteorology. (1959)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1959.

Barzak, Robert William, Assistant Professor of English. (1955, 1958)
B.A., Agricultural and Mechanical College of Texas, 1949; M.A., Illinois, 1951; Ph.D., 1959.

Bashaw, Elexis C., Geneticist of Agricultural Research Service, USDA. (1951, 1955)
B.S., Purdue, 1947; M.S., 1948; Ph.D., Agricultural and Mechanical College of Texas, 1954.

Bass, Daniel Materson, Jr., Associate Professor of Petroleum Engineering. (1954, 1958)
B.S., Louisiana State, 1950; M.S., Agricultural and Mechanical College of Texas, 1955; Reg. Prof. Engr.

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*Resigned October 1, 1960.

Bass, James Horace, Professor of History. (1940, 1955)
B.A., North Texas State Teachers College, 1924; M.A., Texas, 1931; Ph.D., 1933.

Basye, Robert Eugene, Professor of Mathematics. (1940, 1952)
B.A., Missouri, 1929; M.A., Princeton, 1931; Ph.D., Texas, 1933.

Baty, James Bernard, Professor of Civil Engineering. (1948, 1950)
B.S., Agricultural and Mechanical College of Texas, 1925; M.C.E., Cornell, 1950; Reg. Prof. Engr.

Baugh, Orville Lee, Instructor in Mathematics. (1956)
B.S., North Texas State College, 1941; M.S., 1951.

Bayliss, Garland Erastus, Assistant Professor of History. (1956, 1958)
B.S., Arkansas, 1951; M.A., Texas, 1953.

Beachell, Henry M., Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Nebraska, 1930; M.S., Kansas State College, 1933.

Bearden, Harold D., Director of Texas Engineering Extension Service. (1947, 1957)
B.S., Texas Technological College, 1931; M.A., Texas, 1936.

Beasley, Joseph Noble, Associate Professor of Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1949; M.S., 1956.

Bebout, Harley, Associate Professor of Agricultural Economics. (1939, 1959)
B.S., Missouri, 1925; M.S., Agricultural and Mechanical College of Texas, 1939.

Beckham, John Blair, Associate Professor of Chemistry. (1946, 1958)
A.B., Daniel Baker College, 1936; B.S., 1937; M.S., Agricultural and Mechanical College of Texas, 1950.

Beckham, Paul Miles, Instructor in Mechanical Engineering. (1960)
B.S., United States Naval Academy, 1954; M.S., Agricultural and Mechanical College of Texas, 1961.

Bell, Rurel Roger, Associate Professor of Veterinary Parasitology. (1952, 1958)
D.V.M., Georgia, 1952; M.S., Agricultural and Mechanical College of Texas, 1955.

Bennett, Alvin Lowell, Associate Professor of English. (1954, 1957)
B.A., Texas, 1927; M.A., Washington, 1931; Ph.D., Texas, 1952.

Bennett, Edward Moore, Instructor in History. (1960)
B.A., Butler, 1952; M.A., Illinois, 1956.

Bennett, Joseph D., Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Mississippi State College, 1949.

Bennett, Joseph Marion, Jr., Captain, Assistant Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1960.

Benson, Fred Jacob, Dean of Engineering, Executive Officer of the Texas Transportation Institute, and Professor of Civil Engineering. (1937, 1957)
B.S., Kansas State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1936; Reg. Prof. Engr.

Benton, Wilbourn Eugene, Associate Professor of Government. (1957)
B.A., Texas Technological College, 1939; M.A., 1941; Ph.D., Texas, 1948.

Bernard, Cicero Henry, Associate Professor of Physics. (1941, 1947)
A.B., Phillips, 1928; M.S., Kentucky, 1931.

Berry, William Thomas, Jr., Assistant Professor of Animal Husbandry. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1955; Ph.D., 1960.

Bertrand, Clint Albert, Assistant Professor of Industrial Education. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1953.

Biggs, Odie Elmer, Captain, Assistant Professor of Military Science and Tactics. (1957)
B.S., Oklahoma Agricultural and Mechanical College, 1951.

Bird, Luther Smith, Associate Professor of Plant Physiology and Pathology. (1951, 1959)
B.S., Clemson College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1955.

Bitner, Claude Andrell, Jr., Assistant Professor of Economics. (1959)
B.B.A., Texas, 1950; M.A., 1956.

Blackhurst, Homer T., Professor of Horticulture. (1947, 1950)
A.B., Glenville State Teachers College, 1935; M.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., 1947.

Blank, Horace R., Professor of Geology. (1949, 1953)
B.S., Pennsylvania, 1919; Ph.D., 1924.

Bloodworth, Morris Elkins, Professor of Agronomy. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1953; Ph.D., 1958.

Blount, Charles Edwin, Instructor in Physics. (1960)
B.S., Texas Western College, 1954; M.S., Agricultural and Mechanical College of Texas, 1960.

Bonnen, Clarence Alfred, Professor of Agricultural Economics. (1937, 1948)
B.S., Illinois, 1920; M.S., 1924.

Boone, James Leroy, Jr., Assist. Professor of Industrial Education. (1952, 1955)
B.S., Agricultural and Mechanical College of Texas, 1947; M.Ed., 1948.

Boriskie, Ben Bernard, Associate Professor of Physics. (1941, 1959)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1948.

Bossler, Robert Burns, Professor of Petroleum Engineering. (1956)
B.S., Pittsburgh, 1918.

Boughton, Ivan Bertrand, Professor of Veterinary Pathology. (1948, 1953)
D.V.M., Ohio State, 1916.

Branson, Robert Earl, Professor of Agricultural Economics and Sociology. (1955, 1958)
B.S., Southern Methodist, 1941; M.P.A., Harvard, 1948; M.A., 1949; Ph.D., 1954.

Brazzel, James Roland, Associate Professor of Entomology. (1957)
B.S., Louisiana State, 1951; M.S., 1953; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Breitenkamp, Edward Carlton, Associate Professor of Modern Languages. (1953, 1956)
B.A., Drake, 1936; M.A., 1938; Ph.D., Iowa, 1951.

Brewer, Burns W., Professor of Mathematics. (1938, 1957)
A.B., Missouri, 1935; A.M., 1936; Ph.D., 1938.

Bridges, Charles Hubert, Professor of Veterinary Pathology and Head of Department*. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1954; Ph.D., 1957.

Brison, Fred Robert, Professor of Horticulture and Acting Head of Department. (1926, 1960)
B.S., Agricultural and Mechanical College of Texas, 1921; M.S., Michigan State College, 1931.

Brown, Claude Harold, Assistant Professor of Sociology. (1960)
B.A., Berea College, 1955; M.A., Kentucky, 1957; Ph.D., Pennsylvania State, 1960.

Brown, LeRoy C., Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1959)
B.A., Arizona State College, 1940.

Brown, Murray Allison, Assistant Professor of Dairy Science. (1955, 1957)
B.S., Michigan State College, 1950; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Brown, Meta Suche, Professor of Agronomy. (1940, 1955)
B.A., Texas, 1931; M.A., 1933; Ph.D., 1935.

Brown, Stewart Ellsworth, Instructor in Mechanical Engineering. (1951)

Brown, Sidney Overton, Professor of Biology. (1936, 1949)
B.A., Texas, 1932; PhD., 1936.

Brundidge, Kenneth Cloud, Assistant Professor of Meteorology. (1955, 1958)
B.A., Chicago, 1952; M.S., 1953.

Bucaram, Salim Michel, Instructor in Physics. (1960)
B.S., Agricultural and Mechanical College of Texas, 1958.

Buchanan, Spencer Jennings, Professor of Civil Engineering. (1946)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., Massachusetts Institute of Technology, 1931; C.E., Agricultural and Mechanical College of Texas, 1948; Reg. Prof. Engr.

Burchard, Donald Dix, Professor of Journalism and Acting Head of Department. (1948, 1960)
A.B., Beloit College, 1925; A.M., Missouri, 1938.

Burgess, Archie Rostron, Professor of Industrial Engineering and Head of Department. (1948, 1951)
B.S., Washington, 1932; M.S., 1938; Reg. Prof. Engr.

Burke, Horace Reagan, Assistant Professor of Entomology. (1958)
B.S., Sam Houston State Teachers College, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., 1959.

Burns, Edward Eugene, Associate Professor of Horticulture. (1956, 1959)
B.S., Purdue, 1950; M.S., 1952; Ph.D., 1956.

Burns, Patton Wright, Professor of Veterinary Physiology and Pharmacology and Head of Department. (1926, 1935)
B.S., Agricultural and Mechanical College of Texas, 1923; D.V.M., 1926.

Burroughs, Albert Lawrence, Serologist of Department of Veterinary Microbiology. (1954, 1957)
B.S., Wyoming, 1938; M.S., Montana State College, 1941; Ph.D., California, 1946.

Butler, Marvin Harold, Assistant Professor of Economics. (1948)
A.B., McKendree College, 1940; M.A., Illinois, 1948.

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*Effective October 16, 1960.

Butler, Ogbourne Duke, Jr., Professor of Animal Husbandry and Head of Department. (1947, 1956)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947; Ph.D., Michigan State College, 1953.

Byrns, Robert Eugene, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1958)
B.A., Colorado State College of Education, 1933.

Caddess, James Harvey, Associate Professor of Mechanical Engineering. (1940, 1953)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1934; Reg. Prof. Engr.

Cain, Roy Edward, Assistant Professor of English. (1956, 1960)
B.A., North Texas State College, 1953; M.A., 1954.

Calaway, Paul Kenneth, Professor of Chemistry and Head of Department. (1957)
B.A., Arkansas College, 1931; M.S., Georgia Institute of Technology, 1933; Ph.D., Texas, 1938.

Caldwell, Augustus George, Associate Professor of Agronomy. (1954, 1955)
B.S.A., Toronto, 1946; M.A.A., 1948; Ph.D., Iowa State College, 1955.

Calhoun, John C., Jr., Vice-Chancellor for Development and Professor of Petroleum Engineering. (1955, 1960)
B.S., Pennsylvania State College, 1937; M.S., 1941; Ph.D., 1946; Reg. Prof. Engr.

Calliham, Melvin Ray, Professor of Veterinary Medicine and Surgery and Head of Department. (1958)
B.S., Agricultural and Mechanical College of Texas, 1941; D.V.M., 1949.

Calvert, Wesley Donald, Assistant Professor of Journalism. (1954, 1957)
A.B., Missouri, 1951; B.J., 1951.

Camp, Bennie Joe, Associate Professor of Biochemistry and Nutrition. (1956, 1960)
B.S., East Texas State Teachers College, 1949; M.S., Agricultural and Mechanical College of Texas, 1953; Ph.D., 1956.

Cantrell, Wallace Gene, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Cartwright, Thomas Campbell, Professor of Animal Husbandry and of Genetics. (1958)
B.S., Clemson Agricultural College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1954.

Chalk, Alfred Franklin, Professor of Economics and Head of Department. (1936, 1956)
B.A., Baylor, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1950.

Chandler, David Jarrett, Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., United States Military Academy, 1949.

Clark, William Jesse, Assistant Professor of Biology. (1957)
B.S., Utah State Agricultural College, 1950; M.S., 1956; Ph.D., 1958.

Clayton, William Howard, Assistant Professor of Oceanography and Research Scientist. (1954, 1958)
B.S., Bucknell, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Cleland, Samuel Miles, Professor of Engineering Graphics. (1941, 1958)
B.A., West Texas State Teachers College, 1931; M.Ed., Agricultural and Mechanical College of Texas, 1940.

Cleveland, Donald E., Assistant Research Engineer in Civil Engineering. (1959)
B.S., Massachusetts Institute of Technology, 1949; M.Eng., Yale, 1959.

Cochran, Robert Glenn, Professor of Nuclear Engineering and Head of Department. (1959)
A.B., Indiana, 1948; M.S., 1950; Ph.D., Pennsylvania State, 1957.

Cochrane, John Douglas, Assistant Professor of Oceanography and Research Scientist. (1959)
B.S., California, 1943; M.S., Scripps Institute of Oceanography, 1948.

Coffey, Lee Clayton, Professor of Agronomy. (1950, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1950; Ph.D., Iowa State, 1954.

Collier, Jesse Wilton, Associate Agronomist. (1949, 1960)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1952; Ph.D., Rutgers, 1957.

Comfort, Thomas Edwin, Associate Professor of Modern Languages. (1954, 1957)
A.B., Northwestern, 1943; A.M., Illinois, 1951; Ph.D., 1954.

Cook, Benjamin Davy, Associate Professor of Agricultural Education and Specialist in Extension Training. (1950, 1960)
B.S., Agricultural and Mechanical College of Texas, 1934; M.Ed., 1950; Ph.D., Wisconsin, 1957.

Cook, Elton D., Agronomist of Texas Agricultural Experiment Substation, Temple. (1949, 1952)
B.S., Texas Technological College, 1935; M.S., Kansas State, 1948; Ph.D., Nebraska, 1951.

Cooke, Adah Louise, Instructor in English. (1960)
B.J., Missouri, 1944; M.J., Texas, 1950.

Cooley, Bernard Matt, Assistant Professor of Veterinary Medicine and Surgery. (1960)
D.V.M., Agricultural and Mechanical College of Texas, 1948.

Coon, Jesse Bryan, Professor of Physics. (1946, 1957)
A.B., Indiana, 1932; M.A., 1935; Ph.D., Chicago, 1949.

Couch, James Russell, Professor of Biochemistry and Nutrition and of Poultry Science. (1948, 1949)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; Ph.D., Wisconsin, 1948.

CoVan, Jack Phillip, Professor of Industrial Engineering. (1946, 1956)
B.M.E., Ohio State, 1935; B.I.E., 1935; M.S., Illinois, 1942; Reg. Prof. Engr.

Cover, Sylvia A., Professor, Home Economics Department, Texas Agricultural Experiment Station. (1933, 1949)
B.S., Illinois, 1920; M.A., Missouri, 1929; Ph.D., 1933.

Cox, Sidney Saunders, Assistant Professor of English. (1948, 1952)
B.A., Southwest Texas State Teachers College, 1932; M.A., 1939.

Craig, Robert Neal, Associate Professor of Agricultural Education. (1940, 1958)
B.S., Agricultural and Mechanical College of Texas, 1937.

Cratin, Paul David, Instructor in Chemistry. (1960)
B.S., Spring Hill College, 1951; M.S., St. Louis, 1954.

Crawford, Charles William, Associate Dean of Engineering and Professor of Mechanical Engineering. (1919, 1957)
B.S·, Texas Technoligical College, 1943; M.S., Texas, 1946; Ph.D., 1949
Reg. Prof. Engr.

Crawford, Paul B., Assistant Director of Texas Petroleum Research Committee. (1952)
B.S., Texas Technological College, 1943; M.S., Texas, 1946; Ph.D., 1949.

Creswell, Horace Staley, Assistant Professor of English. (1946, 1951)
B.S., Texas Technological College, 1935; M.A., Texas Christian, 1938.

Crittenden, Elmer Pratt, Assistant Professor of English. (1956)
B.A., Boston, 1939; M.A., Southern Methodist, 1946.

Cronk, Alfred Edward, Professor of Aeronautical Engineering and Head of Department. (1956)
B.S., College of Saint Thomas, 1937; M.S., Minnesota, 1946; Reg. Prof. Engr.

Crookshank, Herman Robert, Animal Nutritionist for the Department of Biochemistry and Nutrition, USDA. (1959)
B.S., Northeast Missouri State College, 1938; M.S., 1940; Ph.D., Iowa State, 1942.

Crow, Ulrich Wilson, Professional Counselor with Counseling and Testing Center, Assistant Professor. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Educ., 1956.

Dabbs, Jack Autrey, Professor of Modern Languages. (1950, 1959)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1950.

Dahlberg, Frank Iver, Professor of Animal Husbandry. (1936, 1947)
B.S., Agricultural and Mechanical College of Texas, 1925; M.S., Wisconsin, 1930.

Daniels, Marion Gordon, Assistant Professor of Economics. (1953, 1956)
A.B., Doane College, 1947; M.A., Texas, 1949.

Darrow, Robert Arthur, Professor of Range and Forestry. (1948, 1951)
B.S., New York State College of Forestry, 1932; M.S., Arizona, 1935; Ph.D., Chicago, 1937.

Davey, Ralph Hemmings, Jr., Assistant Professor of Engineering Graphics. (1955, 1958)
B.S., United States Military Academy, 1932.

Davich, T. B., Entomologist, United States Department of Agriculture, Cotton Insect Program. (1956)
B.S., Ohio State, 1948; M.S., Wisconsin, 1951; Ph.D., 1953.

Davies, Ronald Edgar, Assistant Professor of Poultry Science. (1959)
B.S.A., British Columbia, 1954; M.S.A., 1956; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Davis, Donald Dwight, Instructor of Mathematics. (1960)
B.S., Michigan State, 1935.

Davis, Daniel Rowland, Associate Professor of Sociology. (1935, 1947)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1935.

Davis, Joe Eugene, Colonel, Commandant of the School of Military Sciences. (1930, 1951)
B.S., Agricultural and Mechanical College of Texas, 1930.

Davis, Richard Bratton, Associate Professor of Wildlife Management. (1951, 1959)
B.S., Texas College of Arts and Industries, 1940; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1952.

Davis, Richard Harvey, Jr., Associate Professor of Veterinary Physiology and Pharmacology. (1951, 1956)
D.V.M., Agricultural and Mechanical College of Texas, 1941; M.S., 1956.

Davis, William B., Professor of Wildlife Management and Head of Department. (1937, 1946)
B.A., Chico State Teachers College, 1933; M.A., California, 1936; Ph.D., 1937.

Davison, Richard Read, Instructor of Chemical Engineering. (1958)
B.S., Texas Technological College, 1949; M.S., Agricultural and Mechanical College of Texas, 1958.

Decker, John Petty, Instructor of Physics. (1956)
B.S., Arkansas, 1949; M.S., 1953; Reg. Prof. Engr.

Dehlinger, Peter, Professor of Geophysics. (1954, 1957)
B.S., Michigan, 1940; M.S., California Institute of Technology, 1943; Ph.D., 1950.

Denison, John Scott, Associate Professor of Electrical Engineering. (1949, 1954)
B.S., New Mexico Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1949; Reg. Prof. Engr.

Denton, Allen Eugene, Assistant Professor, Counseling and Testing Center. (1951, 1960)
B.A., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1949.

Denton, James Henry, Assistant Professor of Veterinary Medicine and Surgery. (1958)
D.V.M., Agricultural and Mechanical College of Texas, 1945.

DeWerth, Adolphe Ferdinand, Professor of Floriculture and Head of Department. (1946, 1949)
B.S., Ohio State, 1930; M.S., 1931.

Dieckert, Julius Walter, Associate Professor of Biochemistry and Nutrition. (1960)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., 1955.

Dillingham, Harley Clay, Professor of Electrical Engineering. (1922, 1930)
B.S., Agricultural and Mechanical College of Texas, 1922; A.M., Columbia, 1930; Reg. Prof. Engr.

Dillon, Lawrence Samuel, Associate Professor of Biology. (1948, 1955)
B.S., Pittsburgh, 1933; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1954.

Dobson, William Jackson, Professor of Biology and Professional Counselor, Counseling and Testing Center. (1947, 1960)
B.A., Austin College, 1939; Ph.D., Texas, 1946.

Donaldson, Joseph, Jr., Lecturer on Architecture. (1956)

Doran, Edwin Beale, Jr., Associate Professor of Geography. (1960)
B.A., Louisiana State, 1938; M.S., 1947; Ph.D., California, 1953.

Dowell, William Merl, Professor of Health and Physical Education. (1942, 1950)
B.S., Sam Houston State Teachers College, 1929; M.A., George Peabody College, 1932.

*Downard, Richard Walter, Assistant Professor of Mechanical Engineering. (1913, 1939)

Dozier, James Hall, Assistant Professor of Business Administration. (1955, 1959)
LL.B., Texas, 1950.

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*Retired effective October 31, 1960.

Druce, Albert John, Associate Professor of Electrical Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1950.

Duncan, John Thomas, Associate Professor of History. (1943, 1960)
B.A., Simmons College, 1924; M.A., Texas Technological College, 1942.

Duncan, Marion Mahan, Jr., Assistant Professor of Physics. (1960)
B.S., Alabama Polytechnic Institute, 1949; M.S., 1953; Ph.D., Duke, 1956.

Dunlap, Wayne Alan, Assistant Professor of Civil Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1955.

Earle, James Hubert, Assistant Professor of Engineering Graphics. (1957, 1960)
B.Arch., Agricultural and Mechanical College of Texas, 1955.

Eckles, William Elam, Assistant Professor of Business Administration. (1960)
B.S., Agricultural and Mechanical College of Texas, 1928; M.S., 1935.

Edmondson, Vance Ward, Associate Professor of Agricultural Economics. (1956, 1959)
B.S., Arkansas, 1948; M.S., Oklahoma Agricultural and Mechanical College, 1950; Ph.D., Cornell, 1956.

Eisner, Melvin, Professor of Physics. (1948, 1957)
B.A., Brooklyn College, 1942; M.S., North Carolina, 1947; Ph.D., 1948.

Ekfelt, Fred Emil, Professor of English. (1938, 1951)
B.A., Iowa, 1931; M.A., 1932; Ph.D., 1941.

Elder, Frank Lawrence, Colonel, Professor of Military Science and Tactics. (1958)
B.S., United States Military Academy, 1933.

Elkins, Rollin Lafayette, Associate Professor of Business Administration. (1935, 1946)
B.S., Agricultural and Mechanical College of Texas, 1933; M.S., 1935.

Ellett, Edwin Willard, Assistant Professor of Veterinary Medicine and Surgery. (1958)
D.V.M., Georgia, 1953; B.S., Virginia Polytechnic Institute, 1954.

Elmquist, Karl Erik, Associate Professor of English. (1935, 1947)
A.B., Southern Methodist, 1932; M.A., Texas, 1939.

Endrizzi, John Edwin, Assistant Professor of Agronomy and of Genetics. (1955)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1951; Ph.D., Maryland, 1955.

Ergle, David R., Senior Plant Physiologist of Plant Physiology and Pathology Department (Agricultural Research Service, USDA, cooperating). (1944)
B.S., Clemson College, 1926; M.S., North Carolina, 1928; Ph.D., 1930.

Esten, Clarence Kenyon, Assistant Professor of English. (1946, 1951)
A.B., Baylor, 1931; M.A., 1949.

Estes, Dwain McKinley, Assistant Professor of Education. (1959)
B.A., Baylor, 1948; M.Ed., Texas, 1950; Ed.D., 1958.

Evans, Benjamin Hampton, Assistant Professor of Architecture. (1955)
B.Arch., Agricultural and Mechanical College of Texas, 1952.

Evans, Chester Eugene, Instructor in Modern Languages. (1960)
B.A., Texas, 1955.

Fairbanks, Hardy Ewald, Instructor in Civil Engineering. (1957)
B.S., Houston, 1956.

Fanguy, Roy Charles, Assistant Professor of Poultry Science. (1958)
B.S., Mississippi State College, 1951; M.S., Alabama Polytechnic Institute, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1958.

Fear, Frank Augustus, Instructor in Veterinary Pathology. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1959.

Feragen, Robert White, Assistant Professor of English. (1952, 1960)
B.A., Iowa State, 1950; M.A., 1952.

Ferguson, Marvin Harry, Southwestern Director and National Research Coordinator of U.S. Golf Association, Green Section (Department of Agronomy cooperating). (1952, 1953)
B.S., Agricultural and Mechanical College of Texas, 1940; Ph.D., Maryland, 1950.

Ferguson, Thomas Morgan, Associate Professor of Poultry Science. (1946, 1956)
B.A., Southwestern, 1936; M.S., Agricultural and Mechanical College of Texas, 1946; Ph.D., 1954.

Fisher, Flake Leroy, Associate Professor of Agronomy. (1949, 1959)
B.S., New Mexico College of Agriculture and Mechanic Arts, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1959.

Fleming, David Winston, Associate Professor of Mechanical Engineering (1927, 1945)
B.S., Agricultural and Mechanical College of Texas, 1930; M.Ed., 1942.

Fletcher, Robert Holton, Associate Professor of Mechanical Engineering. (1947, 1958)
B.S., Pennsylvania State College, 1928; Reg. Prof. Engr.

Flowers, Archie Ingram, Associate Professor of Veterinary Microbiology. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1942; D.V.M., 1950; M.S., 1959.

Folweiler, A. D., Director of Texas Forest Service. (1949)
B.S., Pennsylvania State College, 1925; M.F., Yale, 1931; Ph.D., Wisconsin, 1943.

Ford, Peter Anthony, Instructor in History. (1960)
B.A., Providence College, 1956; M.A., Notre Dame, 1959; M.M.S., Sorbonne (Paris), 1960.

Franceschini, Guy Arthur, Assistant Professor of Meteorology. (1952, 1957)
B.S., Massachusetts, 1950; M.S., Chicago, 1952; Ph.D., Agricultural and Mechanical College of Texas, 1961.

Franklin, Benjamin David, Instructor in Civil Engineering. (1958)
B.S., North Carolina State College, 1948; B.S., Agricultural and Mechanical College of Texas, 1958.

Fridel, George Edward, Instructor in Electrical Engineering. (1957)
B.S., Houston, 1957.

Fudge, Joseph Franklin, Professor of Agronomy and State Chemist. (1929, 1949)
B.S., Illinois, 1924; M.S., Wisconsin, 1925; Ph.D., 1928.

Futrell, Maurice Chilton, Assistant Professor of Plant Physiology and Pathology and Plant Pathologist (Agricultural Research Service, USDA, cooperating). (1958, 1959)
B.S., Western Kentucky State College, 1947; M.S., Wisconsin, 1949; Ph.D., 1952.

Gaddis, Alvis Mathew, Associate Professor of Mechanical Engineering. (1942, 1958)
A.B., Austin College, 1930.

Gail, Albert, Professor of Aeronautical Engineering. (1959)
Diplom Ingenieur, Munich Institute of Technology, 1932.

Gaines, J. C., Professor of Entomology and Head of Department. (1947, 1952)
B.S., Alabama Polytechnic Institute, 1925; M.S., 1926; Ph.D., Iowa State College, 1937.

Gallaway, Bob Mitchel, Professor of Civil Engineering. (1944, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1946; M.Eng., 1956; Reg. Prof. Engr.

Galvin, Thomas Joseph, Assistant Professor of Veterinary Parasitology. (1959, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1957; M.S., 1961.

Gardner, Frederick Albert, Assistant Professor of Poultry Science. (1959)
B.S., Vermont, 1953; M.S., Agricultural and Mechanical College of Texas, 1955; Ph.D., Missouri, 1960.

Garrison, Roger William, Major, Associate Professor of Air Science. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.B.A., Indiana, 1957.

Gay, Norman Russell, Professor of Mechanical Engineering. (1960)
B.S., Rochester, 1941; M.S., Cornell, 1943; Ph.D., Purdue, 1960.

German, John Paul, Professor of Electrical Engineering. (1958)
B.S., Texas, 1940; M.S., 1949; Ph.D., 1955.

Getzin, Louis W., Associate Professor of Entomology. (1958)
B.S., Wisconsin, 1955; M.S., 1957; Ph.D., 1958.

Gibbons, Eldred Harris, Associate Professor of Microbiology. (1925, 1939)
B.S.A., Tennessee, 1925; S.M., Chicago, 1929.

Gibbs, Leon Wilford, Associate Professor of Veterinary Anatomy. (1949, 1958)
B.S., Agricultural and Mechanical College of Texas, 1939; D.V.M., 1949; M.S., 1957.

Gibbs, Robert H., Associate Professor of Mechanical Engineering. (1956)
B.S., United States Naval Academy, 1925.

Gibson, Roy Howard, Instructor in Mechanical Engineering. (1933, 1947)

Gladden, James Kelly, Professor of Chemistry. (1959)
B.S., Howard College, 1942; M.S., Georgia Institute of Technology, 1944; Ph.D., Northwestern, 1952.

Godbey, Chauncey Barger, Professor of Genetics and Head of Department. (1926, 1946)
B.S., Kentucky, 1925; M.S., Agricultural and Mechanical College of Texas, 1926.

Godfrey, Curtis L., Associate Professor of Agronomy. (1954)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1948; Ph.D., Iowa State College, 1951.

Godwin, Charles Jackson, Assistant Professor of Architecture. (1955)
B.S., Agricultural and Mechanical College of Texas, 1947; Reg. Prof. Arch.; Reg. Prof. Engr.

Goode, Phillip Barron, Professor of Business Administration. (1946, 1949)
B.S., Southern Methodist, 1933; LL.B., 1936; LL.M., Texas, 1953.

Goode, Sterling Doug, Captain, Assistant Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1953.

Gott, George Edwin, Instructor in English. (1957)
B.A., Southeast Missouri State College, 1949; M.A., Texas, 1952.
(On leave of absence.)

Gottschalk, Martin Edward, Instructor in Modern Languages. (1960)
B.A., Texas Lutheran College, 1951; M.A., Texas, 1960.

Gouger, Philip Doyle, Instructor in Journalism. (1960)
B.S., Agricultural and Mechanical College of Texas, 1950; B.S., 1952.

Gould, Frank Walton, Associate Professor of Range and Forestry and Curator of College Museum. (1949)
B.S., Northern Illinois State College, 1935; M.S., Wisconsin, 1937; Ph.D., California, 1941.

Gowing, Gene Martin, Instructor in Veterinary Medicine and Surgery. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; D.V.M., 1959.

Grant, Samuel J., Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Clemson Agricultural and Mechanical College, 1952.

Gravett, Howard L., Professor of Biology. (1946, 1954)
A.B., James Millikin, 1933; M.A., Illinois, 1934; Ph.D., 1939.

Gray, Jarrell D., Associate Professor of Agricultural Education. (1955, 1959)
B.S., Arkansas, 1947; M.S., 1950; D.Ed., 1955.

Greathouse, Charles Alfred, Instructor in Mathematics. (1960)
B.A., Union, 1958; M.S., Texas, 1960.

Greeley, Ralph Cordon, Instructor in Veterinary Anatomy. (1960)
B.S., Missouri, 1953; D.V.M., 1953.

Greer, Clayton Alvis, Associate Professor of English. (1938, 1949)
B.A., Texas, 1921; M.A., 1927; Ph.D., 1937.

Gregory, Charles Edward, Colonel, Professor of Air Science. (1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.B.A., Stanford, 1948.

Groneman, Chris Harold, Professor of Industrial Education and Head of Department; Coordinator of Teacher Education. (1940, 1956)
B.S., Kansas State Teachers College, 1931; M.S., 1935; D.Ed., Pennsylvania State College, 1950.

Gruber, Kenneth Willis, Lieutenant Colonel, Associate Professor of Air Science. (1960)
B.S., United States Air Force Institute of Technology, 1950; M. A., George Washington, 1955.

Grumbles, Leland Creed, Professor of Veterinary Microbiology and Head of Department. (1949, 1957)
D.V.M., Agricultural and Mechanical College of Texas, 1945; M.S., 1957.

Guthrie, William Spurgeon, Associate Professor of Mechanical Engineering. (1942, 1950)
B.S., Central State Teachers College, 1930; M.A., Oklahoma, 1935; Reg. Prof. Engr.

Hale, Fred, Professor of Animal Husbandry in Charge of Swine Investigations. (1922, 1927)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1925.

Haley, William Robert, Jr., Major, Associate Professor of Military Science and Tactics. (1957)
B.B.A., Manhattan College, 1941.

Hall, Charles Franklin, Associate Professor of Veterinary Microbiology. (1959)
B.S., Kansas State College, 1949; D.V.M., 1951; M.S., Michigan State, 1959.

Hall, Claude Hampton, Associate Professor of History. (1951, 1959)
B.A., Virginia, 1947; M.A., 1949; Ph.D., 1954.
(On leave of absence.)

Hall, Dan, Associate Professor of Mathematics. (1928, 1944)
A.B., North Carolina, 1927; A.M., 1928.

Hall, Frederick Charles, Associate Professor of Aeronautical Engineering. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., California Institute of Technology, 1957; Reg. Prof. Engr.

Hall, John William, Visiting Lecturer in Architecture. (1957)
B.S., Agricultural and Mechanical College of Texas, 1941.

Hall, Samuel Joseph, Instructor in Meteorology. (1960)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1960.

Hall, Wayne C., Dean of Graduate Studies and Professor of Plant Physiology and Pathology. (1949, 1960)
B.S., Iowa, 1941; M.S., 1946; Ph.D., 1948.

Hallmark, Glen Duncan, Professor of Electrical Engineering and Head of Department. (1942, 1958)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1946; Ph.D., 1953.

Ham, Joe Strother, Associate Professor of Physics. (1956, 1958)
Ph.B., Chicago, 1948; M.S., 1951; Ph.D., 1954.

Hamilton, Thomas Rowan, Professor of Business Administration. (1929, 1937)
A.B., Washington and Lee, 1917; M.S., Columbia, 1924; Ph.D., 1938.

Hampton, Herbert Elwood, Professor of Agronomy. (1938, 1948)
B.S., Agricultural and Mechanical College of Texas, 1937; Ph.D., Missouri, 1943.

Hancock, Charles Kinney, Professor of Chemistry. (1946, 1949)
B.S., Southwest Texas State Teachers College, 1931; M.A., Texas, 1936; Ph.D., 1939.

Hanna, Ralph Lynn, Associate Professor of Entomology. (1949, 1956)
B.A., Stephen F. Austin State Teachers College, 1939; Ph.D., Agricultural and Mechanical College of Texas, 1951.

Hardaway, Bernice Aubrey, Associate Professor of Engineering Graphics. (1946, 1957)
B.S., East Texas State Teachers College, 1933; M.Ed., Agricultural and Mechanical College of Texas, 1948.

Hardeman, Lyman Bryce, Associate Professor of Industrial Education. (1947, 1957)
B.S., Kansas State Teachers College, 1939; M.Ed., Agricultural and Mechanical College of Texas, 1949.

Harmon, Gerald Stearns, Instructor in Physics. (1957)
B.A., Maine, 1953; M.S., 1956.
(On leave of absence.)

Harrington, Edwin Lincoln, Professor of Civil Engineering. (1939, 1957)
B.S., Wyoming, 1927; C.E., 1937; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1952; Reg. Prof. Engr.

Harrington, Marion Thomas, Chancellor. (1924, 1953)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1927; Ph.D., Iowa State College, 1941.

Harris, James Elliott, Instructor in Mathematics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1957; M.S., 1959.

Harris, Robert Leigh, Assistant Professor of History. (1951, 1955)
A.B., Alabama, 1945; M.A., 1946; Ph.D., Duke, 1956.

Harris, William Birch, Associate Professor of Chemical Engineering. (1956)
B.S., Colorado, 1941.

Harris, William Donald, Professor of Chemical Engineering. (1935, 1949)
B.S., Iowa State College, 1929; M.S., 1931; Ph.D., 1934; Reg. Prof. Engr.

Harrison, Arthur L., Plant Pathologist of Texas Agricultural Experiment Station, Yoakum. (1937, 1947)
B.S., Ontario Agricultural College, 1929; Ph.D., Cornell, 1935.

Harrison, Luther Asbery, Jr., Assistant Professor of Health and Physical Education. (1941, 1949)
B.S., Agricultural and Mechanical College of Texas, 1940.

Hass, Nils Wulf, Instructor in Electrical Engineering. (1960)
B.S., Purdue, 1959.

Hauer, Louis Frederick, Assistant Professor of English. (1937, 1944)
B.A., Dubuque, 1931; M.A., Iowa, 1933.

Haupt, Lewis McDowell, Jr., Professor of Electrical Engineering. (1930, 1948)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1935; Reg. Prof. Engr.

Hawkins, Leslie Virgle, Professor of Industrial Education. (1954, 1959)
B.S., Panhandle Agricultural and Mechanical College, 1938; M.S., Oklahoma Agricultural and Mechanical College, 1946; D.Ed., Pennsylvania State, 1953.

Hays, John Q., Professor of English. (1929, 1945)
A.B., Missouri, 1929; M.A., 1932; Ph.D., California, 1942.

Heaton, Homer Lloyd, Director of Admissions and Registrar, and Secretary of the Academic Council. (1934, 1956)
B.S., Stephen F. Austin State Teachers College, 1929; M.S., Agricultural and Mechanical College of Texas, 1936.

Hebert, James Oliver, Jr., Assistant Professor of Electrical Engineering. (1958, 1960)
B.S., Louisiana State, 1951; M.S., 1957.

Heck, Walter W., Associate Professor of Plant Physiology and Pathology. (1959)
B.S., Ohio State, 1947; M.S., Tennessee, 1950; Ph.D., Illinois, 1954.

Hedgcock, Ernest Duval, Professor of English. (1936, 1949)
B.A., Tennessee, 1917; M.A., Texas, 1936.

Hedges, Richard Marion, Assistant Professor of Chemistry. (1960)
B.S., Southern Methodist, 1950; Ph.D., Iowa State, 1955.

Henry, Walter Keith, Assistant Professor of Meteorology. (1957)
B.S., Missouri, 1941; M.S., Chicago, 1949.

Hensarling, Paul Reginald, Associate Professor of Education and Psychology. (1958, 1960)
B.S., North Texas State College, 1933; M.S., 1940; Ed.D., Houston, 1957.

Hepburn, Charles McGuffey, Instructor in History and Government. (1960)
B.A., Stanford, 1950; M.A., 1957.

Hibdon, James Edward, Associate Professor of Economics. (1959)
B.A., Oklahoma, 1948; M.A., 1949; Ph.D., North Carolina, 1957.

Hierth, Harrison Ewing, Associate Professor of English. (1946, 1957)
A.B., Illinois Wesleyan, 1935; B.Ed., Illinois State Normal, 1936; M.A., Illinois, 1942; Ph.D., Wisconsin, 1956.

Higgins, Edwin Harrison, Captain, Assistant Professor of Air Science. (1957)
B.S., Northwestern State College (Louisiana), 1947.

Hildebrand, Peter Edward, Assistant Professor of Agricultural Economics. (1959)
B.S., Colorado State, 1955; M.S., 1956; Ph.D., Michigan State, 1959.

Hildreth, Roland James, Assistant Director, Texas Agricultural Experiment Station. (1954, 1959)
B.S., Iowa State College, 1949; M.S., 1950; Ph.D., 1954.

Hillman, John Rolfe, Assistant Professor of Mathematics. (1938, 1946)
B.S., Millsaps College, 1923; M.A., Missouri, 1929.

Hinojosa, Jesus Hector, Instructor in Architecture. (1960)
B.Arch., Agricultural and Mechanical College of Texas, 1960.

Hinton, Harwood Perry, Instructor in History. (1960)
B.A., Texas, 1948; M.A., Columbia, 1955.

Hirsch, Teddy James, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952; M.Eng., 1953; Ph.D., 1961.

Hobgood, Price, Professor of Agricultural Engineering and Head of Department. (1939, 1958)
B.S., Agricultural and Mechanical College of Texas, 1938; M.S., 1940; Reg. Prof. Engr.

Hoffman, Anthony Edward, Instructor in Physics. (1959)
B.S., Buena Vista College, 1957; M.S., Missouri School of Mines, 1958.

Hohn, Charles Moran, Assistant Professor of Agricultural Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Holcomb, John W., Jr., Associate Professor of Agricultural Education. (1960)
B.S., Agricultural and Mechanical College of Texas, 1940; M.Ed., 1953.

Holcomb, Robert Marion, Professor of Civil Engineering. (1947)
B.S., Arizona, 1936; M.S., Iowa State College, 1941; Ph.D., 1956; Reg. Prof. Engr.

Holdredge, Edwin Sereno, Professor of Mechanical Engineering. (1939, 1957)
B.S., Tennessee, 1938; M.S., 1939; Reg. Prof. Engr.

Holland, Charles Donald, Professor of Chemical Engineering. (1952, 1959)
B.S., North Carolina State College, 1943; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., 1953.

Holleman, Theo Rufus, Professor of Architecture and Head of Division. (1946, 1958)
B.Arch., Agricultural and Mechanical College of Texas, 1940; M.Arch., 1951; Reg. Prof. Arch.

Holt, Ethan Cleddy, Professor of Agronomy. (1948, 1957)
B.S., Alabama Polytechnic Institute, 1943; M.S., Purdue, 1948; Ph.D., 1950.

Holt, Oris Milton, Associate Professor of Agricultural Education. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.Ed., 1946.

Hood, Donald Wilbur, Professor of Oceanography. (1946, 1960)
B.S., Pennsylvania State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1950.

Hopkins, Sewell Hepburn, Professor of Biology. (1935, 1947)
B.S., William and Mary College, 1927; M.A., Illinois, 1930; Ph.D., 1933.

Horsley, Wendell Graham, Instructor in Architecture. (1959)
B.F.A., Denver, 1950.

Hotchkiss, Thomas Atkins, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1961)
B.A., Virginia Military Institute, 1937.

Houze, Robert Alvin, Library Director. (1949, 1957)
A.B., Denver, 1940; B.L.S., 1941.

Hovorak, Louis Martin, Instructor in Mathematics. (1946)
B.S., Agricultural and Mechanical College of Texas, 1943; M.Ed., 1952.

Hoyle, Samuel Cooke, Jr., Professor of Business Administration. (1947, 1957)
LL.B., Texas, 1926; B.A., 1946; M.A., 1948.

Hubert, Frank William R., Dean of Arts and Sciences. (1959)
B.A., Texas, 1938; M.A., 1945; Ph.D., 1950.

Huebner, George Lee, Jr., Senior Research Scientist. (1958)
B.S., Agricultural and Mechanical College of Texas, 1946; M.S., 1951; Ph.D., 1953.
(On leave of absence.)

Huggett, Milton Alfred, Assistant Professor of English. (1946, 1951)
B.A., Rochester, 1929; B.D., Episcopal Theological School, 1933; M.A., Baylor, 1952.

Huggins, Frank Norris, Assistant Professor of Mathematics. (1954, 1957)
B.A., Howard Payne College, 1948; M.S., North Texas State College, 1950.
(On leave of absence.)

Hughes, Martin Collins, Professor of Electrical Engineering. (1923, 1932)
B.S., Illinois, 1917; E.E., 1926; Reg. Prof. Engr.
(On leave of absence.)

Hunt, Robert Lee, Professor of Agricultural Economics. (1927, 1935)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., North Carolina State College, 1927; Ph.D., Wisconsin, 1934.

Hunter, Parks Caldwell, Jr., Assistant Professor of English. (1955, 1958)
B.A., Miami, 1948; B.Ed., 1949; M.A., 1950; Ph.D., Texas, 1958.

Hurt, John Tom, Professor of Mathematics. (1936, 1947)
B.A., Rice Institute, 1931; M.A., 1932; Ph.D., 1935.

Huss, Donald Lee, Assistant Professor of Range and Forestry. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1954; Ph.D., 1959.

Hutchison, John Elton, Director of Texas Agricultural Extension Service. (1945, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1949; M.Ed., 1950.

Ibert, Edward Robert, Instructor in Oceanography. (1960)
B.S., Tulane, 1950; M.S., Agricultural and Mechanical College of Texas, 1957.

Inglis, Jack Morton, Instructor in Wildlife Management. (1958)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1952.

Ingram, James Drew, Instructor in Business Administration. (1957)
B.B.A., Agricultural and Mechanical College of Texas, 1956.

Irving, John H., Jr., Major, Associate Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1943.

Isbell, Arthur Furman, Associate Professor of Chemistry. (1953, 1956)
B.A., Baylor, 1937; M.S., Texas, 1941; Ph.D., 1943.

Jache, Albert William, Associate Professor of Chemistry. (1955, 1958)
B.S., New Hampshire, 1948; M.S., 1950; Ph.D., Washington, 1952.

Jackson, John Raleigh, Associate Professor of Agricultural Education. (1952, 1957)
B.S., Agricultural and Mechanical College of Texas, 1938; M.Ed., 1948; Ed.D., Houston, 1959.

Jaggi, Frederick Putnam, Jr., Professor of Veterinary Public Health and Head of Department. (1937, 1957)
B.S., Agricultural and Mechanical College of Texas, 1924; D.V.M., 1926.

James, Kate Longstreth, Instructor of English. (1960)
B.A., Los Angeles State College, 1956; M.A., 1960.

Jernigan, Jesse Stewart, Assistant Professor of English. (1952, 1954)
B.A., North Texas State College, 1933; M.A., Southern Methodist, 1946; M.A., California, 1950.

Jessee, William Taze, Captain, Assistant Professor of Military Science and Tactics. (1960)
B.S., United States Military Academy, 1954.

Jimenez, Rudolph August, Assistant Professor of Civil Engineering. (1959)
B.S., Arizona, 1948; M.S., 1951.

Joham, Howard Ernest, Professor of Plant Physiology and Pathology. (1946, 1959)
B.A., Santa Barbara College, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., Iowa State College, 1950.

Jones, Charles Edward, Instructor in Physics. (1957)
B.S., Arkansas, 1952; M.S., 1956.
(On leave of absence.)

Jones, Jerrel Boyd, Instructor in Electrical Engineering. (1960)
B.S., Southern Methodist, 1958; M.S., 1960.

Jones, Truman Ross, Jr., Professor of Civil Engineering. (1947, 1960)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1955.

Jungerman, Paul Frank, Associate Professor of Veterinary Microbiology. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1947; M.S., 1959.

Justin, James Robert, Instructor in Agronomy. (1960)
B.S., Pennsylvania State, 1955; M.S., 1957.

Kadow, William Bruce, Assistant Professor of English. (1954, 1959)
A.B., Arkansas, 1951; M.A., 1952.

Kahan, Archie Marion, Executive Director of Texas Agricultural and Mechanical Research Foundation. (1953, 1954)
B.A., Denver, 1936; M.A., 1940; M.S., California Institute of Technology, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Kasten, Frederick H., Assistant Professor of Biology. (1956, 1957)
B.A., Houston, 1950; M.A., Texas, 1951; Ph.D., 1954.

Kavanaugh, Milam Shelby, Associate Professor of Psychology. (1947, 1951)
B.A., Texas, 1934; M.A., 1934.

Keel, Loyd Bush, Assistant Professor of English. (1942, 1947)
B.A., Texas, 1927; M.A., 1933.

Keese, Charles Joseph, Professor of Civil Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1952.

Kemler, Arden Grant, Associate Professor of Veterinary Anatomy. (1959)
D.V.M., Kansas State College, 1950; M.S., Georgia, 1959.

Kenagy, Herbert Glenn, Associate Professor of Business Administration. (1955, 1957)
Ph.B., Central Missouri Teachers College, 1912; A.B., Missouri, 1916; B.S., 1916; M.A., Minnesota, 1917.

Kennedy, Harvey Thomas, Distinguished Professor of Petroleum Engineering. (1949)
B.S., Cornell, 1921; Ph.D., Johns Hopkins, 1928; Reg. Prof. Engr.

Kent, Jack Thurston, Associate Professor of Mathematics. (1936, 1952)
A.B., Lambuth College, 1930; M.A., Arkansas, 1931.

Keown, Ernest Ray, Professor of Mathematics. (1952, 1960)
B.S., Texas, 1946; Ph.D., Massachusetts Institute of Technology, 1950.

Kerley, Sidney Auston, Director of Counseling and Testing Center and Associate Professor of Education. (1952, 1960)
B.A., Agricultural and Mechanical College of Texas, 1939; M.Ed., North Texas State College, 1950.

Kidd, Harry Lee, Jr., Associate Professor of English. (1939, 1950)
B.A., Texas, 1935; M.A., 1938.

Killebrew, James Bryan, Captain, Assistant Professor of Air Science. (1958)
B.S., Houston, 1951.

Kincannon, John Alvin, Associate Professor of Agricultural Economics. (1946, 1960)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1949; Ph.D., 1952.

Kindall, Sheldon Milam, Instructor in Mathematics. (1956)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., Louisiana State, 1956.

King, Donald Roy, Associate Professor of Entomology. (1953, 1958)
B.S., Baldwin-Wallace College, 1949; M.S., Ohio State, 1951; Ph.D., 1952.

King, General Tye, Associate Professor of Animal Husbandry. (1953, 1960)
B.S., Kentucky, 1950; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1958.

King, Merton Pruett, Instructor in English. (1960)
B.A., Westminster College, 1951; M.A., Texas, 1953.

Klatt, Fred, Jr., Assistant Professor of Architecture. (1957, 1960)
B.S., Agricultural and Mechanical College of Texas, 1952.

Klipple, Edmund Chester, Professor of Mathematics and Head of Department. (1935, 1952)
B.A., Texas, 1926; Ph.D., 1932.

Knapp, Robert Andrew, Instructor in Mathematics. (1957)
B.S., United States Naval Academy, 1922; M.Ed., Agricultural and Mechanical College of Texas, 1954.

Koenig, Karl Joseph, Associate Professor of Geology. (1955, 1957)
B.S., Illinois, 1941; M.S., 1946; Ph.D., 1949.

Kohel, Russel James, Geneticist. (1959)
B.S., Iowa State College, 1956; M.S., Purdue, 1958; Ph.D., 1959.

Konecny, Frank Jack, Executive Assistant, Engineering Extension Service. (1955)
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940.

Kraemer, Duane Carl, Instructor in Animal Husbandry. (1960)
B.S., Wisconsin, 1955; M.S., Agricultural and Mechanical College of Texas, 1960.

Kranz, Edward Douglas, Instructor in Mechanical Engineering. (1952)

Krise, George Martin, Associate Professor of Biology. (1959)
B.A., Texas, 1946; M.A., 1948; Ph.D., 1952.

Kroitor, Harry Peter, Assistant Professor of English. (1958)
B.A., Saskatchewan, 1946; M.A., 1950; Ph.D., Maryland, 1957.

Krueger, Willie F., Professor of Poultry Science. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1949; Ph.D., Missouri, 1952.

Kunkel, Harriott Orren, Professor of Animal Husbandry and of Biochemistry and Nutrition. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1948; Ph.D., Cornell, 1950.

Kunze, George William, Professor of Agronomy. (1952, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.S., 1950; Ph.D., Pennsylvania State College, 1952.

Kunze, Otto Robert, Associate Professor of Agricultural Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Iowa State College, 1951.

Kutach, Wilbur Dee, Professional Counselor and Assistant Professor, Counseling and Testing Center. (1952, 1960)
B.S., Agricultural and Mechanical College of Texas, 1951; M.Ed., 1952.

Kyre, Martin Theodore, Jr., Instructor in History and Government. (1959)
B.A., Ohio Wesleyan, 1950; M.A., Washington, 1957.

LaMotte, Charles, Professor of Biology. (1930, 1939)
B.A., Texas, 1929; M.A., 1929; Ph.D., Illinois, 1937.

Landiss, Carl Wilson, Professor of Health and Physical Education. (1943, 1954)
B.S., Abilene Christian College, 1935; M.Ed., Agricultural and Mechanical College of Texas, 1947; D.Ed., Pennsylvania State College, 1951.

Lane, Harry Cleburne, Associate Professor of Plant Physiology and Pathology. (1953, 1959)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., 1951; Ph.D., Iowa State College, 1953.

Lang, Herbert Howard, Associate Professor of History. (1956, 1959)
B.A., Texas, 1949; M.A., 1950; Ph.D., 1954.

Laverty, Carroll Dee, Professor of English. (1939, 1955)
A.B., Colorado, 1933; A.M., 1934; Ph.D., Duke, 1951.

Lee, Dean Ralph, Assistant Professor of Chemistry. (1941, 1947)
B.S., Memphis State College, 1937; M.S., Agricultural and Mechanical College of Texas, 1939.

Leighton, Rudolph Elmo, Professor of Dairy Science. (1947, 1956)
B.S., Oklahoma Agricultural and Mechanical College, 1932; M.S., 1943; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Leinweber, Charles Lee, Professor of Range and Forestry and Head of Department. (1960)
B.S., Agricultural and Mechanical College of Texas, 1952; M.S., 1953; Ph.D., 1956.

Leipper, Dale F., Professor of Oceanography and Meteorology and Head of Department. (1949, 1950)
B.S., Wittenberg College, 1937; M.A., Ohio State, 1939; Ph.D., California, 1950.

Leland, Thomas William, Professor of Business Administration and Head of Division. (1922, 1926)
B.A., Wisconsin, 1921; M.S., 1922; C.P.A., 1928.

Letbetter, Thomas Doyle, Associate Professor of Business Administration. (1948)
B.B.A., Texas, 1933; M.S., Agricultural and Mechanical College of Texas, 1947; C.P.A., 1949.

Lewis, Robert Donald, Director of Texas Agricultural Experiment Station. (1946)
B.S., Pennsylvania State College, 1919; Ph.D., Cornell, 1926.

Liebhafsky, Erwin Eugene, Professor of Economics. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1947; M.S., 1948; Ph.D., Illinois, 1950.

Lindsay, James Donald, Professor of Chemical Engineering and Head of Department. (1938, 1944)
B.S., Michigan, 1924; M.S., 1925; Ph.D., 1934; Reg. Prof. Engr.

Little, Van Allen, Professor of Entomology. (1923, 1937)
B.A., Sam Houston State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1925; Ph.D., 1943.

Logan, Earl, Jr., Assistant Professor of Mechanical Engineering. (1955, 1958)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1958. Reg. Prof. Engr.
(On leave of absence.)

Long, John A., Instructor in Agronomy. (1958)
B.S., Idaho, 1952; M.S., Washington State College, 1954.

Lowe, Dan Copeland, Instructor in Business Administration. (1955)
B.S., Stephen F. Austin State College, 1946; M.Ed., 1951.

Loyd, Coleman Monroe, Assistant Professor of Physics. (1953, 1957)
B.S., Nebraska State Teachers College, 1939; M.A., Wayne, 1948; M.S., Agricultural and Mechanical College of Texas, 1955.

Luke, Hugh Jay, Jr., Instructor in English. (1960)
B.A., Texas, 1956; M.A., 1957.

Luther, Herbert Adesla, Professor of Mathematics. (1937, 1947)
B.A., Pittsburgh, 1934; M.S., Iowa, 1935; Ph.D., 1937.

Lyerly, Paul J., Research Coordinator, Substation No. 17, Texas Agricultural Experiment Station, Ysleta. (1942, 1958)
B.S., North Carolina State College, 1938; M.S., Iowa State College, 1940; Ph.D., 1942.

Lyle, Robert Reed, Assistant Professor of Mathematics. (1937, 1946)
B.S., Washington and Jefferson College, 1931; M.A., Buffalo, 1933.

Lyles, Henry Francis, Instructor in Business Administration. (1958)
B.B.A., North Texas State College, 1956; M.B.A., 1957.

Lyman, Carl Morris, Professor of Biochemistry and Nutrition and Head of Department. (1940, 1949)
B.S., Oregon, 1931; A.M., Oregon State College, 1933; Ph.D., Pittsburgh, 1937.

Lynch, Shirley Alfred, Professor of Geology and Head of Department of Geology and Geophysics. (1946)
B.S., Missouri, 1928; M.S., 1931; E.M., 1935; Reg. Prof. Engr.

Lyons, Charles Rogers, Director of Student Health. (1956, 1957)
A.B., Miami, 1938; M.D., Ohio State, 1941.

McAfee, Thomas Edison, Professor of Agronomy. (1939, 1957)
B.S., Oklahoma Agricultural and Mechanical College, 1939; M.S., 1940; Ph.D., Agricultural and Mechanical College of Texas, 1953.

McCasland, William Richard, Assistant Professor of Civil Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1955; M.S., 1957.
(On leave of absence.)

McCorvey, David Dixon, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1958)
B.S., Georgia, 1939.

McCrady, James David, Assistant Professor of Veterinary Physiology and Pharmacology. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1952; D.V.M., 1958.

McCulley, William Straight, Associate Professor of Mathematics. (1937, 1957)
B.A., Iowa State, 1932; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., Texas, 1956.

McCully, Wayne Gunther, Associate Professor of Range and Forestry. (1948, 1960)
B.S., Colorado State College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; Ph.D., 1958.

McCune, William Edward, Professor of Agricultural Engineering. (1959)
B.S., Kansas State College, 1940; M.S., Agricultural and Mechanical College of Texas, 1944.

McGee, Roger Valentine, Associate Professor of Mathematics. (1928, 1948)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1938.

McGuire, John Gilbert, Professor of Architecture and Assistant Dean of Engineering. (1935, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; M.S., 1937; B.S., 1944; Reg. Prof. Engr.

McLellan, Hugh John, Associate Professor of Oceanography. (1957, 1959)
B.S., Dalhousie University, Halifax, Nova Scotia, 1941; M.S., 1947; Ph.D., Scripps Institute of Oceanography, 1956.

McMurry, Edgar Dowling, Assistant to the Dean of Veterinary Medicine. (1955, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1951.

McNeely, John Gordon, Professor of Agricultural Economics. (1947, 1950)
B.S., South Dakota State College, 1933; M.S., 1934; Ph.D., Wisconsin, 1941.

McNiel, Norbert Arthur, Assistant Professor of Genetics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1935; M.Ed., 1952; Ph.D., 1955.

Mackin, John Gilman, Professor of Biology and Head of Department. (1950, 1960)
B.S., East Central State College, Ada, Oklahoma, 1924; M.S., Illinois, 1927; Ph.D., 1933.

Magee, Aden Combs, Professor of Agricultural Economics. (1955, 1956)
B.S., Kansas State College, 1924; M.S., Agricultural and Mechanical College of Texas, 1926.

Mamaliga, Emil, Associate Professor of Health and Physical Education. (1947, 1957)
B.S., Ohio State, 1943; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Manning, Walter Scott, Associate Professor of Business Administration. (1941, 1947)
B.B.A., Texas College of Arts and Industries, 1932; M.B.A., Texas, 1940; C.P.A., 1952.

Marsh, James Hyde, III, Assistant Professor of Architecture. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1957.

Martin, Lee Jackson, Associate Professor of English. (1946, 1957)
B.S., Texas, 1941; M.A., 1948; Ph.D., Stanford, 1956.

Mason, Paul M., Associate Professor of Engineering Graphics. (1946, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1946.

Mattern, Terrence John, Assistant Professor of English. (1953, 1957)
B.A., George Peabody College, 1947; M.A., 1947.

Maxwell, Norman Paul, Associate Horticulturist. (1946, 1955)
B.S., Delaware, 1943; M.S., Agricultural and Mechanical College of Texas, 1949.

Medlen, Ammon Brown, Associate Professor of Biology. (1946, 1955)
B.A., Baylor, 1930; M.A., 1932; Ph.D., Agricultural and Mechanical College of Texas, 1952.

Mestanza, Walter Froilan, Assistant Professor of Veterinary Pathology. (1960)
D.V.M., Universidad Nacional de San Marcos (Lima), 1951; M.S., Virginia Polytechnic Institute, 1959.

Metzer, Robert Benjamin, Instructor in Agronomy. (1958)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1959.

Meyers, Edward Arthur, Assistant Professor of Chemistry. (1956)
B.S., Michigan, 1950; Ph.D., Minnesota, 1955.

Middleton, Errol Bathurst, Professor of Chemistry. (1922, 1942)
B.A., Illinois, 1919; M.S., 1921; Ph.D., 1938.

Miller, Charles Edward, Assistant Professor of Biology. (1959)
B.S., Furman, 1951; M.A., North Carolina, 1954; Ph.D., 1957.

Miller, Charles Standish, Assistant Professor of Plant Physiology and Pathology. (1958)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956; Ph.D., 1959.

Miller, Jarvis Ernest, Associate Professor of Agricultural Economics. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1950; M.S., Purdue, 1951; Ph.D., 1954.

Miller, Thomas Lloyd, Associate Professor of History. (1946, 1957)
B.A., East Texas State Teachers College, 1935; M.A., 1945; Ph.D., Texas, 1956.

Milliff, John Henry, Professor of Veterinary Anatomy and Head of Department. (1936, 1941)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1934; D.V.M., 1936; Ph.D., Texas, 1958.

Mills, Jim Frank, Assistant Professor of Agronomy. (1946, 1954)
B.S., Agricultural and Mechanical College of Texas, 1943; M.S., 1953.

Mitchell, Richard Warren, Assistant Professor of Physics. (1947, 1954)
B.S., Lynchburg College, 1943; M.S., Agricultural and Mechanical College of Texas, 1953.

Moehlman, Carl B., Instructor in Mathematics. (1942)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1932.

Mohr, Hubert Charles, Associate Professor of Horticulture. (1946, 1956)
B.S., Ohio State, 1938; M.S., 1939; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Monroe, Haskell Moorman, Jr., Instructor in History and Government. (1959)
B.A., Austin College, 1952; M.A., 1954.

Moore, Albert Vernon, Professor of Dairy Science. (1937, 1944)
B.S., Purdue, 1927; M.S., 1933; Ph.D., Michigan State College, 1948.

Moore, Bill C., Associate Professor of Mathematics. (1937, 1948)
A.B., Kansas, 1929; A.M., 1931; A.M., Princeton, 1937.

Moore, Clarence Albert, Associate Professor of Agricultural Economics. (1954, 1958)
B.S., West Texas State College, 1945; M.S., Illinois, 1946.

Moore, Donald Sylvester, Assistant Professor of Agricultural Economics and Sociology. (1956)
B.S., Oklahoma Agricultural and Mechanical College, 1938; M.S., 1940; Ph.D., Minnesota, 1956.

Moore, Richard Wayne, Assistant Professor of Veterinary Microbiology. (1958)
D.V.M., Agricultural and Mechanical College of Texas, 1955; M.S., 1956.

Moore, William Michael, Instructor in Civil Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1956.

Morgan, Stewart Samuel, Professor of English and Head of Department. (1921, 1952)
B.A., Cincinnati, 1926; M.A., Ohio State, 1927; Ph.D., 1933.

Moyer, Vance Edwards, Associate Professor of Meteorology. (1958, 1960)
B.S., Pennsylvania State, 1950; M.S., 1951; Ph.D., 1954.

Mullins, Benjamin Franklin Kelso, Professor of Engineering Graphics. (1921, 1954)
A.B., Emory, 1919; M.S., 1922; M.R.E., Southwestern Baptist Theological Seminary, 1927; M.S., Agricultural and Mechanical College of Texas, 1944; Reg. Prof. Engr.

Murray, Joyce Elaine, Assistant Professor of Education. (1960)
B.A., Texas Technological College, 1942; M.Ed., Sam Houston State Teachers College, 1952.

Myers, James Arthur, Athletic Director. (1958)
B.S., Tennessee, 1947.

Nance, Joseph Milton, Professor of History and Head of Department of History and Government. (1941, 1958)
B.A., Texas, 1935; M.A., 1936; Ph.D., 1941.

Nash, James Mosely, Instructor in Mechanical Engineering. (1957)
B.S., Houston, 1957.
(On leave of absence.)

Naugle, Norman Wakefield, Instructor in Mathematics. (1958)
B.A., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Naylor, Harry Benjamin, Instructor in Veterinary Medicine and Surgery. (1959)
D.V.M., Agricultural and Mechanical College of Texas, 1938.

Nelson, Al B., Professor of History. (1937, 1956)
B.A., Texas Christian, 1932; M.A., 1933; Ph.D., California, 1937.

Nelson, Bardin Hubert, Professor of Sociology. (1950, 1956)
B.S., Louisiana State, 1942; M.A., 1943; Ph.D., 1950.

Nichols, Reuben Brian, Instructor in English. (1960)
B.A., Baylor, 1949; M.A., 1951; LL.B., 1954.

Noyes, Theodore Alvan, Assistant Professor of Mechanical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1957.

O'Bannon, Lester Severance, Professor of Mechanical Engineering. (1948)
B.M.E., Kentucky, 1915; M.E., 1939; Reg. Prof. Engr.

Odom, Richard Edward, Assistant Professor of Floriculture. (1951, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; B.S., 1951; M.S., Colorado Agricultural and Mechanical College, 1953.

Old, William Donald, II, Captain, Assistant Professor of Military Science and Tactics. (1960)
B.S., United States Military Academy, 1954.

Oldham, William Jennings Bryan, Jr., Instructor in Mathematics. (1957)
B.S., Agricultural and Mechanical College of Texas, 1956; M.S., 1958.

Oliver, John Eoff, Assistant Professor of Business Administration. (1959)
B.B.A., Texas, 1929; M.S., Agricultural and Mechanical College of Texas, 1937.

Oliver, John Percy, Professor of Engineering Graphics. (1936, 1956)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1936; Reg. Prof. Engr.

Olson, Edward O., Pathologist of Department of Horticulture, USDA, Substation No. 15. (1949)
B.S., South Dakota State, 1940; M.S., Colorado State, 1944; Ph.D., Louisiana State, 1948.

Olson, Robert Merle, Instructor in Civil Engineering. (1959)
B.S., Texas, 1947; M.S., Rice Institute, 1959.

Orr, Joseph Anderson, Professor of Civil Engineering. (1928, 1944)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1933; Reg. Prof. Engr.

Orts, Frank August, Instructor in Animal Husbandry. (1960)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1959.

Packenham, Edward S., Associate Professor of Business Administration. (1947, 1955)
B.S., Lombard College, 1928; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1949.

Page, John Orion, Associate Professor of Chemistry. (1948, 1951)
B.S., Rochester, 1927; Ph.D., Illinois, 1933.

Palmer, Leslie Lloyd, Associate Professor of Health and Physical Education. (1951, 1960)
B.S., Agricultural and Mechanical College of Texas, 1948; M.Ed., 1951.

Parker, Charles Fredrick, Instructor in Animal Husbandry. (1959)
B.S., Ohio State, 1957; M.S., 1958.

Parker, Grady P., Professor of Education and Head of Department of Education and Psychology. (1940, 1954)
B.A., North Texas State Teachers College, 1929; M.A., Southern Methodist 1935; Ed.D., Texas, 1942.

Parker, Travis Jay, Professor of Geology. (1947, 1952)
B.S., Texas Technological College, 1933; M.A., Texas, 1939; Ph.D., 1952; Reg. Prof. Engr.

Parnell, Edward Douglas, Professor of Poultry Science. (1938, 1943)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1934.

Parry, Douglas Farlow, Professor of Education and Psychology. (1956)
B.A., Utah, 1937; M.A., 1938; Ph.D., Syracuse, 1942.

Pate, David Azariah, Instructor in Floriculture. (1960)
B.S., Agricultural and Mechanical College of Texas, 1959; M.S., 1960.

Paterson, Donald R., Associate Horticulturist, Department of Horticulture. (1952, 1956)
B.S., Cornell, 1947; M.S., California, 1950; Ph.D., Michigan State, 1952.

Patterson, LaVerne Victory, Assistant Professor of Industrial Education. (1956)
B.S., Illinois, 1940; M.S., 1948.

Patterson, Raleigh Elwood, Dean of Agriculture. (1958, 1960)
B.S., Louisiana State, 1934; M.S., Agricultural and Mechanical College of Texas, 1936; Ph.D., 1943.

Peach, Robert Marvin, Major, Associate Professor of Military Science and Tactics. (1959)
B.A., Randolph-Macon College, 1941.

Pedigo, John Randolph, Associate Professor of Petroleum Engineering. (1953)
B.S., Texas, 1935; B.A., 1935.

Peirce, James Franklin, Assistant Professor of English. (1946, 1951)
A.B., Illinois, 1940; M.A., Iowa, 1942.

Penberthy, Walter Lawren, Professor of Health and Physical Education. (1926, 1959)
B.S., Ohio State, 1926.

Perry, Bruce A., Horticulturist, Department of Horticulture. (1946, 1951)
B.S., Wake Forest College, 1930; M.A., 1936; Ph.D., Virginia, 1942.

Perry, Haile Deucalion, Assistant Professor of Mathematics. (1955, 1959)
B.S., Sam Houston State Teachers College, 1939; M.A., 1949.

Perry, John Vivian, Jr., Assistant Professor of Mechanical Engineering. (1949, 1955)
B.S., Virginia Polytechnic Institute, 1947; M.S., Agricultural and Mechanical College of Texas, 1954; Reg. Prof. Engr.

Peters, Isaac Isaac, Associate Professor of Dairy Science. (1950, 1952)
B.S.A., Manitoba, 1942; M.S., Michigan State College, 1944; Ph.D., Iowa State College, 1947.

Pinnell, Charles, Assistant Professor of Civil Engineering. (1958)
B.S., Texas Technological College, 1952; M.S., Purdue, 1958.

Ponthieux, Nicholas Archibald, Associate Professor of Health and Physical Education. (1941, 1956)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1950.

Porter, Kenneth Boyd, Agronomist of Department of Agronomy. (1947, 1957)
B.S., Kansas State College, 1940; M.S., Iowa State College, 1947; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Potter, George Edwin, Professor of Zoology. (1939)
B.S., Ottawa, 1921; M.S., Iowa, 1923; Ph.D., 1927; D.Sc., Ottawa, 1946.

Potter, James Gregor, Professor of Physics and Head of Department. (1945)
B.S., Princeton, 1928; M.S., New York, 1931; Ph.D., Yale, 1939.

Potts, Richard Carmechial, Assistant Director of Agricultural Instruction and Professor of Agronomy. (1936, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1935; M.S., Agricultural and Mechanical College of Texas, 1945; Ph.D., Nebraska, 1950.

Powell, Francis Warren, Assistant Professor of English. (1937, 1944)
B.A., Austin College, 1920; M.A., Texas, 1928.

Prescott, John Mack, Professor of Biochemistry and Nutrition. (1952, 1959)
B.S., Southwest Texas State Teachers College, 1941; M.S., Agricultural and Mechanical College of Texas, 1949; Ph.D., Wisconsin, 1952.

Price, Alvin Audis, Dean of the School of Veterinary Medicine. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1940; D.V.M., 1949; M.S., 1956.

Price, Manning A., Associate Professor of Entomology. (1940, 1957)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1941.

Priddy, Tommy Glynn, Instructor in Mechanical Engineering. (1960)
B.S., Texas Technological College, 1959.

Provost, Richard Leon, Instructor of Education and Psychology and of Counseling and Testing Center. (1956, 1960)
B.A., Drake, 1951; M.S., 1956.

Putnam, Harlan Ray, Associate Professor of Economics. (1941, 1946)
B.S., Iowa State College, 1935; M.A., 1941.

Quinby, John Roy, Agronomist of Texas Agricultural Experiment Station, Chillicothe. (1924, 1925)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Quinn, Major Charles, Instructor in Modern Languages. (1960)
B.S., Stanford, 1948; M.A., 1952.

Quisenberry, John Henry, Professor of Poultry Science and Head of Department. (1936, 1946)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., Illinois, 1933; Ph.D., 1936.

Rae, Kenneth MacFarlane, Professor of Oceanography and Meteorology. (1957, 1959)
B.S., University College, London, 1935; Ph.D., London, 1958.

Rakoff, Henry, Associate Professor of Chemistry. (1953, 1957)
B.S., City College of New York, 1944; M.S., Purdue, 1948; Ph.D., 1950.

Ramge, John Christian, Associate Professor of Veterinary Medicine and Surgery. (1959)
D.V.M., Ohio State, 1942; M.S., 1950; Ph.D., 1955.

Ramsey, Jerry Dwain, Assistant Professor of Industrial Engineering. (1958, 1960)
B.S., Agricultural and Mechanical College of Texas, 1955.

Randall, John Del, Assistant Professor of Nuclear Engineering. (1958, 1959)
B.S., California, 1955; M.S., 1956.

Randolph, Neal Malcolm, Associate Professor of Entomology. (1957)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1938.

Ransdell, Clifford Howell, Assistant to the Dean of Engineering and Professor of Engineering Graphics. (1937, 1960)
B.S., Texas Technological College, 1937; B.S., Agricultural and Mechanical College of Texas, 1953; Sc.D., Howard Payne College, 1956; M.Ed., Texas, 1957; Reg. Prof. Engr.

Ray, Sammy Mehedy, Assistant Professor of Oceanography. (1959)
B.S., Louisiana State, 1942; M.A., Rice Institute, 1952; Ph.D., 1954.

Redden, Joseph Eugene, Assistant Professor of Journalism. (1959)
B.A., Hardin-Simmons, 1947; M.A., 1948.

Redmond, Harold Edwin, Professor of Veterinary Medicine and Surgery. (1940, 1952)
D.V.M., Agricultural and Mechanical College of Texas, 1939.

Reeves, Robert Gatlin, Professor of Genetics. (1928, 1947)
B.S., Mississippi State College, 1922; M.S., 1923; Ph.D., Iowa State College, 1928.
(On leave of absence.)

Reid, Robert Osborne, Professor of Oceanography and Meteorology. (1951, 1959)
B.E., Southern California, 1946; M.S., Scripps Institute of Oceanography, 1948.

Reiser, Raymond, Professor of Biochemistry and Nutrition. (1949, 1954)
A.B., Western Reserve, 1929; Ph.D., Ohio State, 1936.

Rekoff, Michael George, Jr., Assistant Professor of Electrical Engineering. (1954, 1957)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955; Ph.D., Wisconsin, 1961; Reg. Prof. Engr.

Rhodes, Robert Raymond, Associate Professor of Range and Forestry. (1946, 1954)
B.S.F., Louisiana, 1937; M.S., Agricultural and Mechanical College of Texas, 1951.

Rhodes, William Herschel, Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Arkansas State College, 1949.

Richardson, Luther Ray, Professor of Biochemistry and Nutrition. (1946, 1949)
B.S., Georgetown College, 1923; A.M., Missouri, 1928; Ph.D., 1932.

Richmond, Thomas Rollin, Agronomist of Department of Agronomy (Agricultural Research Service, USDA, cooperating). (1931, 1954)
B.S., Agricultural and Mechanical College of Texas, 1931; M.S., 1938; Ph.D., Minnesota, 1948.

Rife, William Thomas, Jr., Captain, Assistant Professor of Military Science and Tactics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1950.

Riggs, John Kamm, Professor of Animal Husbandry. (1941, 1955)
B.S., Iowa State College, 1935; M.S., Agricultural and Mechanical College of Texas, 1941.

Roberts, Jesse Claude, Jr., Assistant Professor of History. (1956, 1957)
B.S., Sam Houston State Teachers College, 1949; B.A., 1950; M.A., Texas, 1953; Ph.D., 1955.
(On leave of absence.)

Roberts, Sidney I., Assistant Professor of History. (1956, 1960)
B.S., College of the City of New York, 1952; M.A., Columbia, 1953.

Robertson, Walter Volley, Instructor in Biology. (1960)
B.S., Stephen F. Austin State College, 1951; M.S., Agricultural and Mechanical College of Texas, 1959.

Roche, John Edward, Associate Professor of Business Administration. (1957)
B.S., Baylor, 1946; M.A., Texas, 1950; Ph.D., 1956.

Rode, Norman Frederick, Professor of Electrical Engineering. (1922, 1930)
B.S., Clemson College, 1919; M.S., Agricultural and Mechanical College of Texas, 1929; E.E., Clemson College, 1939; Reg. Prog. Engr.

Rodenberger, Charles Alvord, Associate Professor of Aeronautical Engineering. (1960)
B.S., Oklahoma State, 1948; M.S., Southern Methodist, 1959; Reg. Prof. Engr.

Rodewald, Fred Arthur, Instructor in English. (1959)
B.A., Agricultural and Mechanical College of Texas, 1958; M.A., North Texas State College, 1959.

Roeber, Charles Arthur, Business Manager. (1929, 1954)
B.B.A., Texas, 1929; B.A., 1929.

Romane, William Murry, Associate Professor of Veterinary Medicine and Surgery. (1956, 1960)
D.V.M., Agricultural and Mechanical College of Texas, 1943.

Roots, Edmund Nelson, Jr., Assistant Professor of Electrical Engineering. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1956.

Rosberg, David William, Professor of Plant Physiology and Pathology and Head of Department. (1950, 1960)
B.A., St. Olaf College, 1940; M.S., Ohio State, 1946; Ph.D., 1949.

Rose, Norman Carl, Assistant Professor of Chemistry. (1956)
B.S., California, 1950; Ph.D., Kansas, 1957.

Ross, Henry, Professor of Agricultural Education. (1935)
B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1935.
(On leave of absence.)

Rotsch, Melvin Medford, Professor of Architecture. (1950, 1955)
B.S., Texas, 1928; M.Arch., Harvard, 1930.

Rowan, Neilon Joyce, Assistant Professor of Civil Engineering and Assistant Research Engineer, Texas Transportation Institute. (1959)
B.S., Texas Technological College, 1957; M.S., Agricultural and Mechanical College of Texas, 1959.

Rudder, James Earl, President of the College. (1958, 1959)
B.S., Agricultural and Mechanical College of Texas, 1932; LL.D., Baylor, 1960.

Rupel, Isaac Walker, Professor of Dairy Science and Head of Department. (1945)
B.S., Illinois, 1923; M.S., Wisconsin, 1924; Ph.D., 1932.

Russell, Daniel, Professor of Sociology. (1926)
A.B., Baylor, 1922; A.M., Chicago, 1928.

Russell, Leon Horace, Jr., Assistant Professor of Veterinary Public Health. (1959)
B.S., Missouri, 1956; D.V.M., 1956; M.P.H., Tulane, 1958.

Russell, Ralph Keith, Assistant Professor of Physics. (1946, 1955)
B.S., Nebraska State Teachers College, 1936; M.S., Agricultural and Mechanical College of Texas, 1954.

Russell, William Low, Professor of Geology. (1946, 1951)
B.A., Yale, 1920; M.S., 1922; Ph.D., 1927.
(On leave of absence.)

Ryan, Cecil Benjamin, Assistant Professor of Poultry Science. (1947, 1949)
B.S., Texas College of Arts and Industries, 1938; M.S., Agricultural and Mechanical College of Texas, 1947.

Samson, Charles Harold, Jr., Professor of Aeronautical Engineering. (1960)
B.S., Notre Dame, 1947; M.S., 1948; Ph.D., Missouri, 1953; Reg. Prof. Engr.

Sandstedt, John Leonard, Assistant Professor of Business Administration. (1954, 1960)
B.A., Texas, 1942; LL.B., 1947.

Sanford, Tommy Eugene, Instructor in Meteorology. (1960)
B.S., Texas, 1954.

Sasaki, Yoshikazu, Research Scientist in Oceanography and Meteorology. (1956, 1957)
M.S., Tokyo, 1950; Ph.D., 1955.

Schatte, Curtis Eric, Instructor in English. (1960)
B.A., Sam Houston State Teachers College, 1949; M.A., 1952.

Schertz, Keith Francis, Geneticist. (1959)
B.S., Illinois, 1949; M.S., 1950; Ph.D., Cornell, 1957.

Schiller, Robert Edwin, Jr., Associate Professor of Civil Engineering. (1946, 1955)
B.S., Agricultural and Mechanical College of Texas, 1940; M.S., 1949; Reg. Prof. Engr.

Schlesselman, George Wilhelm, Associate Dean of the School of Arts and Sciences; Professor of Geography and Head of Department. (1934, 1959)
B.A., Iowa State Teachers College, 1927; M.A., Clark, 1928; Ph.D., Nebraska, 1935.

Schrader, Allen, Instructor in English. (1957)
B.A., Los Angeles State College, 1956; M.A., 1957.

Schram, Alfred Francis, Associate Professor of Chemistry. (1953, 1956)
B.A., Oklahoma, 1941; M.S., 1943; Ph.D., 1948.

Schroeder, Melvin Carroll, Associate Professor of Geology. (1954, 1956)
B.S., State College of Washington, 1942; M.S., 1947; Ph.D., 1953.

Segner, Edmund Peter, Jr., Assistant Professor of Civil Engineering. (1954, 1956)

B.S., Texas, 1949; M.S., 1952; Reg. Prof. Engr.
Segrest, Herman Brazill, Professor of Health and Physical Education. (1945, 1958)
B.S., North Texas State Teachers College, 1937; M.S., 1946; M.Ed., Agricultural and Mechanical College of Texas, 1955.

Seward, Clay Luzenberg, Jr., Associate Professor of Geology. (1948, 1952)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., 1950; Geol.E., 1953.

Shelton, Maurice, Assistant Animal Husbandman of Texas Agricultural Experiment Station, Department of Animal Husbandry. (1950, 1957)
B.S., Tennessee, 1948; M.S., 1951; Ph.D., Agricultural and Mechanical College of Texas, 1956.

Shepperd, James Nolen, Assistant Professor of English. (1941, 1947)
B.A., Texas, 1931; M.A., 1936.

Shubinski, Robert Parker, Instructor in Civil Engineering. (1958)
B.A., Rice Institute, 1957; B.S., 1958.
(On leave of absence.)

Simmang, Clifford Max, Professor of Mechanical Engineering and Head of Department. (1938, 1957)
B.S., Agricultural and Mechanical College of Texas, 1936; M.S., 1938; Ph.D., Texas, 1952; Reg. Prof. Engr.

Simmons, John William, Captain, Assistant Professor of Military Science and Tactics. (1958)
B.S., Alabama, 1950.

Sims, Stillman Austin, Associate Professor of Mathematics. (1942, 1959)
B.S., Southwest Texas State Teachers College, 1939; M.S., Agricultural and Mechanical College of Texas, 1944.

Skrabanek, Robert Leonard, Professor of Sociology. (1949, 1957)
B.S., Agricultural and Mechanical College of Texas, 1942; M.S., 1947; Ph.D., Louisiana State, 1949.

Skrivanek, John Marion, Associate Professor of Modern Languages. (1952, 1959)
B.A., Texas, 1938; M.A., 1946; Ph.D., Charles (Prague), 1948.

Smerdon, Ernest Thomas, Associate Professor of Agricultural Engineering. (1959)
B.S., Missouri, 1951; M.S., 1956; Ph.D., 1959.

Smith, Benjamin Frederick, Major, Associate Professor of Air Science. (1960)
B.A., United States Air Force Institute of Technology, 1951; A.B., Wittenberg College, 1953; M.B.A., Ohio State, 1956.

Smith, Elmer Gillam, Professor of Physics. (1924, 1942)
A.B., Amherst College, 1919; M.S., Agricultural and Mechanical College of Texas, 1925; B.S., 1934; M.E., 1939; Ph.D., Texas, 1941.

Smith, Fred Emmett, Professor of Geology. (1948, 1956)
B.S., Louisiana State, 1930; M.S., 1932.

Smith, Frank Miller, Associate Professor of Civil Engineering. (1948, 1957)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1939; Reg. Prof. Engr.

*Smith, Hilton Atmore, Professor of Veterinary Pathology and Head of Department. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

Smith, James Clifton, Superintendent of Substation No. 3, Angleton. (1951)
B.S., Agricultural and Mechanical College of Texas, 1939; M.S., 1947.

Smith, James Douglas, Assistant Professor of Genetics. (1959)
B.S., Iowa State College, 1950; M.S., 1956; Ph.D., 1960.

Smith, Ronald Edward, Instructor in Physics. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Smith, Robert Lee, Jr., Associate Professor of Industrial Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1952.

Snuggs, Roland Edward, Associate Professor of Chemistry. (1924, 1946)
A.B., Georgetown College, 1920; M.S., Florida, 1923; B.S., Agricultural and Mechanical College of Texas, 1937.

Snyder, Roy Webster, Extension Meat Specialist, Texas Agricultural Experiment Station. (1930)
B.S., Iowa State College, 1921; M.S., 1922.

Sorensen, Anton Marinus, Jr., Associate Professor of Animal Husbandry. (1955, 1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., Cornell, 1951; Ph.D., 1953.

Sorensen, Harold Benjamin, Associate Professor of Agricultural Economics and Sociology. (1951, 1956)
B.S., South Dakota State College, 1940; M.S., Oklahoma Agricultural and Mechanical College, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Sorenson, Jerome Wallace, Professor of Agricultural Engineering. (1946, 1956)
B.S., Agricultural and Mechanical College of Texas, 1935; M.S., 1948.

Sorrels, Joseph Harrell, Professor of Civil Engineering. (1941, 1948)
A.B., Texas Christian, 1924; M.S., Vanderbilt, 1925; B.S., Agricultural and Mechanical College of Texas, 1946; Reg. Prof. Engr.

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*Retired October 15, 1960.

Southern, John Hoyle, Associate Professor of Agricultural Economics. (1959)
B.S., Oklahoma Agricultural and Mechanical College, 1936; M.S., Agricultural and Mechanical College of Texas, 1949.

Sperry, John Jerome, Professor of Biology. (1941, 1951)
B.A., Nebraska, 1936; M.A., Missouri, 1938; Ph.D., Nebraska, 1942.

Sperry, Omer Edison, Professor of Range and Forestry. (1946, 1949)
A.B., Peru, Nebraska State College, 1925; M.A., Nebraska, 1931; Ph.D., 1934.

Spurlock, William W., Instructor in Chemistry. (1958)
B.A., Daniel Baker College, 1924.

Stacell, Alan Louis, Instructor in Architecture. (1960)
B.F.A., Illinois, 1955; M.F.A., 1960.

Stallings, Henry Green, Instructor in Mechanical Engineering. (1946)

Stark, Lawrence Edward, Professor of Engineering Graphics. (1941, 1960)
B.S., Agricultural and Mechanical College of Texas, 1941; M.Ed., 1951.

Staten, Raymond D., Associate Professor of Agronomy. (1956, 1960)
B.S., Oklahoma Agricultural and Mechanical College, 1947; M.S., Nebraska, 1949; Ph.D., 1951.

Stelly, Randall, Associate Professor of Agricultural Economics and Sociology. (1956, 1960)
B.S., Southwestern Louisiana Institute, 1940; M.S., Agricultural and Mechanical College of Texas, 1947; Ph.D., Louisiana State, 1956.

Stephenson, Henson Knowlen, Professor of Civil Engineering. (1945, 1957)
B.S., Alabama Polytechnic Institute, 1923; M.S., Michigan, 1931; C.E., Alabama Polytechnic Institute, 1941.

Stern, Louis Harold, Assistant Professor of Economics. (1955, 1957)
B.S., Illinois, 1947; M.A., California, 1954.

Stevenson, Leland Lewis, Major, Associate Professor of Military Science and Tactics. (1960)
B.S., Agricultural and Mechanical College of Texas, 1948.

Stevenson, Robert M., Professor of Business Administration. (1947)
B.A., Duke, 1937; M.A., Pennsylvania State College, 1946; C.P.A., 1948; D.B.A., Indiana, 1955; C.L.U., 1955.

Stewart, Billy Ray, Assistant Professor of Agricultural Engineering. (1956, 1960)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1959.

Stewart, Norman Arthur, Jr., Associate Professor of Business Administration. (1946, 1957)
LL.B., Baylor, 1938.

Stipe, Dennis Ray, Instructor in Agricultural Engineering. (1959)
B.S., Agricultural and Mechanical College of Texas, 1958.

Stokes, Elmore Ewing, Jr., Associate Professor of English. (1951, 1958)
B.A., Texas, 1943; M.A., 1948; Ph.D., 1951.
(On leave of absence.)

Storey, James Benton, Assistant Professor of Horticulture. (1957)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1953; Ph.D., California, 1957.

Street, William Ezra, Professor of Engineering Graphics and Head of Department. (1941)
B.S., Texas Technological College, 1930; M.A., 1933; LL.D., Harding College, 1947; Reg. Prof. Engr.

Stuverud, Homer Alton, Lieutenant Colonel, Associate Professor of Military Science and Tactics. (1960)
B.A., State Teachers College, Mayville, North Dakota, 1937; M.A., North Carolina, 1954.

Tatum, Finley Womack, Lecturer in Electrical Engineering. (1960)
B.S., Columbia, 1935; M.S., 1946.

Taylor, Lloyd Chamberlin, Jr., Assistant Professor of History. (1956, 1958)
B.A., Lehigh, 1949; M.A., 1951; Ph.D., 1956.

Taylor, Lloyd Hughes, Jr., Assistant Professor of Business Administration. (1959)
B.B.A., Baylor, 1949; M.A., 1950.

Tefertiller, Kenneth Ray, Assistant Professor of Agricultural Economics. (1959)
B.S., Oklahoma State, 1952; M.S., 1957; Ph.D., Illinois, 1959.

Thames, Walter Hendrix, Jr., Associate Professor of Plant Physiology and Pathology. (1959)
B.S.A., Florida, 1947; M.A., 1948; Ph.D., 1959.

Thompson, Aylmer Henry, Associate Professor of Oceanography and Meteorology. (1960)
A.B., California at Los Angeles, 1947; M.A., 1948; Ph.D., Massachusetts Institute of Technology, 1960.

Thompson, Herbert Gordon, Jr., Associate Professor of Business Administration. (1951, 1954)
B.S., Miami, 1947; M.B.A., 1949.

Thompson, John George Hatch, Professor of Mechanical Engineering. (1938, 1954)
B.S., Pennsylvania State College, 1933; M.E., 1938; M.S., Agricultural and Mechanical College of Texas, 1950; Reg. Prof. Engr.

Thompson, Robert Dale, Assistant Professor of Business Administration. (1960)
B.A., DePauw, 1925; M.A., Trinity, 1960.

Thornton, William Lee, Instructor in Business Administration. (1958)
B.A., Indiana, 1957; M.B.A., 1958.

Timm, Tyrus Raymond, Professor of Agricultural Economics and Sociology and Head of Department. (1947, 1953)
B.S., Agricultural and Mechanical College of Texas, 1934; M.S., 1936; M.P.A., Harvard, 1947; D.P.A., 1949.

Tishler, Carl Edward, Professor of Health and Physical Education and Head of Department. (1941, 1947)
B.S., Ohio State, 1926; M.A., Western Reserve, 1935.

Tittle, Morris Edward, Associate Professor of Mathematics. (1943, 1959)
B.A., East Texas State Teachers College, 1923; M.A., Texas, 1937.

Titus, Robert Stephen, Instructor in Veterinary Medicine and Surgery. (1960)
B.S., Oklahoma State, 1958; D.V.M., 1959.

Tomme, Warren James, Instructor in Chemical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1957.

Traxler, Ralph N., Professor of Civil Engineering. (1959)
A.B., Colorado, 1920; M.A., 1922; Ph.D., Wisconsin, 1926.

Trogdon, William Oren, Professor of Agronomy and Head of Department. (1958)
B.S., Oklahoma State, 1942; Ph.D., Ohio State, 1949.

Truettner, Willard Irving, Professor of Mechanical Engineering. (1930, 1943)
B.S., Michigan, 1928; M.S.E., 1930; Reg. Prof. Engr.

Turk, Richard Duncan, Professor of Veterinary Parasitology and Head of Department. (1944)
D.V.M., Kansas State College, 1933; M.S., Agricultural and Mechanical College of Texas, 1939.

Turney, H. A., Assistant Professor of Entomology. (1958)
B.S., Arkansas, 1952; M.S., 1956.

van Buijtenen, Johannes Petrus, Visiting Lecturer, Genetics. (1960)
B.S., Landbowhogeschool (Netherlands), 1952; M.S., California, 1953; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Vanderzant, Carl, Associate Professor of Dairy Science. (1953, 1957)
B.S., Wageningen, 1947; M.S., 1949; M.S., Iowa State College, 1950; Ph.D., 1953.

Vanderzant, Erma Schumacher, Biochemist of Department of Biochemistry and Nutrition. (1954)
B.S., Iowa State, 1943; Ph.D., 1953.

Varvel, Walter A., Professor of Psychology. (1941, 1945)
A.B., Kansas, 1932; M.A., 1933; Ph.D., 1938.

Vrooman, Richard, Professor of Architecture. (1949, 1960)
B.A., Oberlin College, 1941; B.Arch., Western Reserve, 1949; M.Arch., Agricultural and Mechanical College of Texas, 1952; Reg. Prof. Arch.

Wagner, William Grant, Assistant Professor of Architecture. (1954, 1956)
B.Arch., Texas, 1949; Reg. Prof. Arch.

Wainerdi, Richard Elliott, Assistant to the Dean of Engineering and Associate Professor of Petroleum Engineering. (1957, 1959)
B.S., Oklahoma, 1952; M.S., Pennsylvania State, 1955; Ph.D., 1958.

Walden, James Cecil, Assistant Professor of Architecture. (1959, 1960)
B.Arch., Agricultural and Mechanical College of Texas, 1955.

Waldrip, William Jasper, Assistant Professor of Range and Forestry. (1950, 1952)
B.S., Agricultural and Mechanical College of Texas, 1949; M.S., 1950.

Walker, Jack Vernon, Instructor in Nuclear Engineering. (1960)
B.S., Agricultural and Mechanical College of Texas, 1958; M.S., 1960.

Wallmo, Olof Charles, Associate Professor of Wildlife Management. (1955, 1959)
B.S., Utah State Agricultural College, 1946; M.S., Wisconsin, 1948; Ph.D., Agricultural and Mechanical College of Texas, 1957.

Walton, Ernest Vernon, Professor of Agricultural Education and Head of Department. (1946, 1953)
B.S., Agricultural and Mechanical College of Texas, 1937; M.S., 1947.

Walton, Henry Harrison, Instructor in Health and Physical Education. (1958)
B.S., Northwestern State College, 1957; M.S., 1958.

Wamble, Albert Cecil, Research Engineer of Texas Engineering Experiment Station. (1945)
B.S., Agricultural and Mechanical College of Texas, 1933.

Ward, Robert Page, Professor of Electrical Engineering. (1925, 1943)
B.S., Agricultural and Mechanical College of Texas, 1924; M.S., 1934.

Watkins, Gustav McKee, Director of Agricultural Instruction and Professor of Plant Physiology and Pathology. (1949, 1960)
B.A., Texas, 1929; M.S., 1930; Ph.D., Columbia, 1935.

Weaver, James Nevin, Associate Professor of Entomology. (1957)
B.A., Southwestern, 1941; M.S., Agricultural and Mechanical College of Texas, 1943; Ph.D., 1953.

Weekes, Donald Fessenden, Professor of Physics. (1937, 1945)
B.S., Middlebury College, 1924; M.A., Amherst College, 1926; Ph.D., Cornell, 1937.

Weihing, Ralph Martin, Agronomist of Texas Agricultural Experiment Station, Beaumont (Agricultural Research Service, USDA, cooperating). (1953)
B.S., Colorado Agricultural and Mechanical College, 1930; M.S., Nebraska, 1932; Ph.D., 1934.

Weihs, Phillip Donald, Captain, Assistant Professor of Air Science. (1957)
B.B.A., St. Mary's, 1949; M.B.A., Southern Methodist, 1960.

Weiner, Peter Douglas, Assistant Professor of Mechanical Engineering. (1956, 1959)
B.S., Agricultural and Mechanical College of Texas, 1954; M.S., 1961.

Weitzel, Hulbert Frederick, Captain, Assistant Professor of Air Science. (1958)
B.B.A., Houston, 1949.

Welch, Nathan Edgar, Instructor in Chemical Engineering. (1957)
B.S., Agricultural and Mechanical College of Texas, 1953; M.S., 1956.

Wells, Charles B., Jr., Major, Associate Professor of Air Science. (1959)
B.A., Georgia, 1941.

Whealy, Roger Dale, Professor of Chemistry. (1958)
B.S., Eastern Normal, South Dakota, 1930; M.S., Colorado, 1937; M.S., Oregon, 1948; Ph.D., Colorado, 1953.

Whitehouse, Ulysses Grant, Technical Director, Electron Microscope Laboratory, Biochemistry and Nutrition Department. (1953)
B.S., Kentucky, 1940; M.S., 1941; M.S., Iowa, 1942; Ph.D., Agricultural and Mechanical College of Texas, 1955.

Whitehurst, Charles Augustus, Instructor in Mechanical Engineering. (1959)
B.S., Louisiana State, 1956; M.S., Southern Methodist, 1959.

Whiteley, Eli Lamar, Associate Professor of Agronomy. (1946, 1959)
B.S., Agricultural and Mechanical College of Texas, 1941; M.S., North Carolina State, 1949; Ph.D., Agricultural and Mechanical College of Texas, 1959.

Whiting, Robert Louis, Professor of Petroleum Engineering and Head of Department. (1946, 1954)
B.S., Texas, 1939; M.S., 1943; Reg. Prof. Engr.

Whitmore, Frank Charles, Assistant Professor of Physics. (1951, 1956)
A.B., Gettysburg College, 1949; M.A., Delaware, 1951.

Whitney, Howard Stephen, Assistant Professor of Agricultural Economics. (1954)
B.S., Oklahoma Agricultural and Mechanical College, 1943; M.S., 1948.

Whitson, Frank Edward, Assistant Professor of Architecture. (1960)
B.Arch., Agricultural and Mechanical College of Texas, 1956; M.Arch., Massachusetts Institute of Technology, 1958.

Whittington, William E., Associate Professor of Business Administration. (1954, 1957)
B.B.A., Texas, 1939; M.B.A., 1947; Ph.D., Illinois, 1957.

Wieder, Russell Karl, Assistant Professor of Health and Physical Education. (1956, 1960)
B.A., Kenyon College, 1942.

Wiening, Victor, Assistant Professor of English. (1952, 1956)
B.A., Valparaiso, 1947; M.A., Louisiana State, 1949.

Wiff, Donald Ray, Instructor in Physics. (1960)
B.S., Capital, 1958; M.A., Kent State, 1960.

Wilkes, Lambert Henry, Associate Professor of Agricultural Engineering. (1957)
B.S., Clemson Agricultural and Mechanical College, 1948; M.S., Agricultural and Mechanical College of Texas, 1953.

Williams, Mack Lester, Instructor in Mathematics. (1955)
B.S., North Texas State Teachers College, 1942; M.S., 1949.

Wilson, Basil Wrigley, Professor of Oceanography. (1953, 1959)
B.S., Capetown, 1931; M.S., Illinois, 1939; C.E., 1940; D.Sc., Capetown, 1953.

Wingren, Roy Matthew, Professor of Mechanical Engineering. (1928, 1943)
B.S., Agricultural and Mechanical College of Texas, 1927; M.S., 1934; Reg. Prof. Engr.

Wolf, Kenneth, Major, Associate Professor of Air Science. (1959)
B.B.A., Baylor, 1955.

Wood, Norris Philip, Associate Professor of Microbiology. (1955, 1960)
B.S., Hartwick College, 1949; M.S., Cornell, 1951; Ph.D., Pennsylvania, 1955.

Wood, Robert Porter, Associate Professor of Business Administration. (1948, 1955)
B.B.A., Sam Houston State Teachers College, 1947; M.S., Agricultural and Mechanical College of Texas, 1950; C.P.A., 1951.

Woolket, Joseph John, Professor of Modern Languages and Head of Department. (1925, 1945)
A.B., Oberlin College, 1924; M.A., 1925.

Wooten, Alvin Boyd, Associate Professor of Agricultural Economics. (1960)
B.A., Agricultural and Mechanical College of Texas, 1937; M.S., 1950; Ph.D., 1955.

Worley, Willard Parker, Instructor in Electrical Engineering. (1956)
B.S., Agricultural and Mechanical College of Texas, 1947.

Wright, Samuel Robert, Professor of Civil Engineering and Head of Department. (1923, 1946)
B.S., Agricultural and Mechanical College of Texas, 1922; M.S., 1928; C.E., 1931; Ph.D., 1946; Reg. Prof. Engr.

Wykes, Stanley Allen, Professor of Industrial Engineering. (1947, 1951)
B.S., Pennsylvania State College, 1940; M.S., Virginia Polytechnic Institute, 1946; Reg. Prof. Engr.

Wynes, Charles Eldridge, Instructor in History. (1958)
B.S., Madison, 1952; M.A., Virginia, 1957.

Wythe, Landon Douglas, Jr., Assistant Professor of Animal Husbandry. (1957, 1959)
B.S., Agricultural and Mechanical College of Texas, 1951; M.S., 1955.

Yantis, Theodore R., Professor of Business Administration. (1952, 1956)
A.B., Otterbein College, 1947; M.B.A., Ohio State, 1949; Ph.D., 1955.

Young, Bernard Theodore, Instructor in Physics. (1960)
B.S., State Teachers College, Slippery Rock, Pennsylvania, 1952.

Young, Mark Francis, Instructor in Veterinary Medicine and Surgery. (1960)
B.S., Utah State, 1955; D.V.M., Iowa State, 1958.

Young, Paul A., Plant Pathologist of Texas Agricultural Experiment Station, Jacksonville. (1935)
B.S., Wabash College, 1921; M.A., Illinois, 1923; Ph.D., 1925.

Yungul, Sulhi. H., Assistant Professor of Geology and Assistant Research Engineer with Texas Engineering Experiment Station. (1960)
B.S., Montana School of Mines, 1943; M.S., California Institute of Technology, 1944.

Zimmerman, Howard Karl, Jr., Associate Professor of Chemistry. (1952, 1955)
B.S., Washington, 1942; M.A., Leland Stanford, 1944; Ph.D., Oregon, 1948.

Zingaro, Ralph Anthony, Associate Professor of Chemistry. (1954, 1959)
B.S., City College of New York, 1946; M.S., Kansas, 1949; Ph.D., 1950.

Zinn, Bennie A., Director of Student Personnel Services. (1945, 1958)
B.S., Agricultural and Mechanical College of Texas, 1926; M.S., 1928.

## RETIRED FACULTY MEMBERS

Adriance, Guy Webb, Professor Emeritus of Horticulture. (1921, 1960)
B.S., Agricultural and Mechanical College of Texas, 1915; M.S., California, 1917; Ph.D., Michigan State College, 1929.

Bagley, John Brewer, Professor Emeritus of Cotton Marketing. (1905, 1947)
B.A., Wake Forest College, 1900.

Berry, Raymond Orvil, Professor Emeritus of Animal Husbandry. (1931, 1960)
B.S., North Texas State Teachers College, 1928; M.S., Agricultural and Mechanical College of Texas, 1932; Ph.D., Johns Hopkins, 1939.

Brewer, Alexander Van, Professor Emeritus of Mechanical Engineering. (1922, 1957)
B.S., Purdue, 1913; M.E., 1925; M.S., Agricultural and Mechanical College of Texas, 1937; Reg. Prof. Engr.

Cofer, David Brooks, Professor of English and Archivist Emeritus. (1910, 1957)
A.B., Centre College, 1907; M.A., Wisconsin, 1927.

Darnell, Albert Laurie, Professor Emeritus of Dairy Science. (1914, 1957)
B.S., Mississippi State College, 1914; M.A., Missouri, 1916.

Doak, Clifton Childress, Professor Emeritus of Biology. (1926, 1960)
B.S., North Texas State Teachers College, 1922; M.S., Agricultural and Mechanical College of Texas, 1928; Ph.D., Illinois, 1933.

*Downard, Richard Walter, Assistant Professor Emeritus of Mechanical Engineering. (1913, 1961)

Dunn, Ralph Clark, Professor Emeritus of Veterinary Bacteriology and Hygiene. (1911, 1950)
D.V.M., Ohio, 1911.

Gammon, Samuel Rhea, Professor Emeritus of History. (1925, 1957)
A.B., Washington and Lee, 1911; M.A., 1913; Ph.D., Johns Hopkins, 1921.

Gunter, Percy Glyndon, Professor Emeritus of English. (1911, 1955)
A.B., Elon College, 1909; M.A., North Carolina, 1910.

Harter, Edward Lin, Associate Professor Emeritus of Chemistry. (1921, 1959)
A.B., Missouri Wesleyan, 1919; M.A., Kansas, 1927.

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*Effective October 31, 1960.

Jones, Beecher Calvin, Assistant Professor Emeritus of Chemistry. (1921, 1947)
A.B., Baylor, 1921; B.S., Agricultural and Mechanical College of Texas, 1923; M.S., 1926.

Jones, Fred Rufus, Professor of Agricultural Engineering. (1921, 1958)
B.S., Wisconsin, 1915; M.S., Iowa State College, 1931.

Key, Percy Clark, Associate Professor Emeritus of English. (1924, 1957)
B.A., Texas Christian, 1917; M.A., Vanderbilt, 1918.

Kyle, Edwin Jackson, Dean Emeritus of the School of Agriculture. (1902, 1945)
B.S., Agricultural and Mechanical College of Texas, 1899; B.S.A., Cornell, 1901; M.S.A., 1902; D.Sc., Arkansas, 1941.

Langford, Ernest, Professor Emeritus of Architecture. (1915, 1957)
B.S., Agricultural and Mechanical College of Texas, 1913; M.S., Illinois, 1924; Reg. Prof. Arch.

Lenert, August Albert, Professor Emeritus of Veterinary Medicine and Surgery. (1919, 1958)
B.S., Agricultural and Mechanical College of Texas, 1914; D.V.M., Kansas City Veterinary College, 1917.

Miller, Horace Otis, Associate Professor of Journalism. (1947, 1948)
A.B., Texas, 1918; M.J., 1920; LL.B., 1928.

Mogford, Joseph Sayers, Professor of Agronomy. (1925, 1937)
B.S., Agricultural and Mechanical College of Texas, 1916; M.S., 1920.

Nelson, Thomas Robert, Associate Professor Emeritus of Mathematics. (1925, 1957)
B.A., East Texas Normal College, 1917; M.A., Texas, 1922.

Overall, John Wayne, Instructor of Physics. (1943, 1957)
A.B., Baylor, 1921; M.Ed., Agricultural and Mechanical College of Texas, 1950.

Porter, Walter Lee, Professor Emeritus of Mathematics. (1918, 1959)
A.B., Howard College, 1911; M.S., Agricultural and Mechanical College of Texas, 1926.

Potts, William McDaniel, Professor Emeritus of Chemistry. (1926, 1958)
B.S., Chicago, 1921; M.S., 1927; Ph.D., 1937.

Reinhard, Henry J., Professor Emeritus of Entomology. (1947, 1960)
B.S., Ohio State, 1915.

Richey, John Jefferson, Professor Emeritus of Civil Engineering. (1912, 1959)
B.S., Illinois, 1903; C.E., 1910.

Rogers, Bruce Allison, Professor of Mechanical Engineering. (1957)
B.S., Iowa State College, 1916; M.S., Chicago, 1920; Ph.D., Harvard, 1933; Reg. Prof. Engr.

Sandstedt, Carl Edward, Professor Emeritus of Civil Engineering. (1923, 1959)
A.B., Leland Stanford, 1910; M.S., Agricultural and Mechanical College of Texas, 1928; Reg. Prof. Engr.

Silvey, Oscar William, Professor Emeritus of Physics. (1916, 1951)
A.B., Indiana, 1907; A.M., 1910; Ph.D., Chicago, 1915.

*Smith, Hilton Atmore, Professor of Veterinary Pathology. (1949)
D.V.M., Colorado Agricultural and Mechanical College, 1928; M.S., Michigan, 1935; Ph.D., 1949.

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*Effective October 16, 1960.

Summey, George, Jr., Professor Emeritus of English. (1922, 1951)
A.B., Southwestern Presbyterian, 1897; M.A., 1898; Ph.D., Columbia, 1919.

Trotter, Ide Peebles, Dean Emeritus of the Graduate School and Professor Emeritus of Agronomy. (1936, 1960)
B.A., Mississippi College, 1915; B.S., Mississippi State College, 1918; M.S., 1921; Ph.D., Wisconsin, 1933.

Vezey, Edward Earl, Professor of Physics. (1920, 1952)
B.S., Oklahoma Agricultural and Mechanical College, 1910; M.S., Agricultural and Mechanical College of Texas, 1927.

Wapple, Albert Russell, Instructor in Mathematics. (1942)
B.S., California, 1914; M.A., 1915.

Weaver, Paul, Distinguished Professor of Geology and Geophysics. (1953)
A.B., Columbia, 1908; Reg. Prof. Engr.

Wilcox, George Barton, Professor Emeritus of Education and Psychology. (1920, 1959)
B.S., Sam Houston State Teachers College, 1912; B.S., Agricultural and Mechanical College of Texas, 1923; A.M., Columbia, 1926.

Winkler, Charles Herman, Professor Emeritus of Psychology. (1923, 1946)
B.S., Texas, 1904; M.A., 1914; Ph.D., Missouri, 1916.

Young, Vernon Alphus, Professor of Range and Forestry. (1929, 1946)
B.S., Utah State Agricultural College, 1932; M.S., Iowa State College, 1924; Ph.D., Minnesota, 1929.

## SUMMARY OF THE COLLEGE STAFF AS OF FEBRUARY 1, 1961

| | Active | On Leave | Total |
|---|---|---|---|
| College Administrative Officers | 13 | 0 | 13 |
| Full Professors, including Heads of Departments and Divisions | 191 | 4 | 195 |
| Associate Professors | 160 | 3 | 163 |
| Assistant Professors | 149 | 5 | 154 |
| Instructors | 90 | 5 | 95 |
| Other Members of the Academic Council | 11 | 0 | 11 |
| Other Members of the Graduate Faculty | 37 | 0 | 37 |
| Total | 651 | 17 | 668 |

# AGRICULTURAL INSTRUCTION, RESEARCH, EXTENSION AND SERVICES

**R. E. Patterson, Dean of Agriculture**
**The A. and M. College of Texas**
**College Station, Texas**

The land-grant college agricultural team operating at College Station and throughout the State includes agricultural instruction by the School of Agriculture, basic and applied research by the Texas Agricultural Experiment Station, education for adults and youth on the farms and ranches and in the homes by the Texas Agricultural Extension Service.

Agricultural programs involving resident instruction, research, and extension are coordinated in subject-matter departments. The head of each subject-matter department is responsible for the planning and coordination of those areas of activities covered by his department. Heads of departments are responsible directly to the Dean of Agriculture through the Director of Agricultural Instruction for instruction, the Director of the Texas Agricultural Experiment Station for research, and the Director of the Texas Agricultural Extension Service for extension activities. Veterinary research and extension are conducted in the School of Veterinary Medicine under the immediate direction of the School's Dean through the Director of the Texas Agricultural Experiment Station.

Most staff members in the several agricultural departments have dual responsibilities of teaching and research. These, along with extension specialists within a department, are housed together to provide close coordination and cooperation in these activities. In addition to formal instruction to enrolled students, practically all departments and services participate in many specialized short courses and workshops given for adults and youths at College Station and over the State.

The Texas Agricultural Experiment Station also maintains and operates 44 experimental field stations over the State. Research among these locations is coordinated closely with the subject-matter departments and the Main Station at College Station. For administrative purposes, Texas is divided into 12 Extension Service districts, each headed by a district agricultural agent and a district home demonstration agent who supervise the extension programs of the county agents in the district. Associated with the districts and field units are area specialists who are highly trained and experienced in specific problem areas of the district.

Further information on the activities of any department or service may be obtained from its headquarters.

## THE TEXAS AGRICULTURAL EXPERIMENT STATION

**Administration:**

Robert D. Lewis, Ph.D., Director
Roland J. Hildreth, Ph.D., Assistant Director—Programs
Victor E. Schember, M.S., Assistant Director—Business and Fiscal
Alvin A. Price, D.V.M., M.S., Assistant Director—Veterinary Research
Paul J. Lyerly, Ph.D., Research Coordinator, Trans-Pecos Area

**Agricultural Information Office:**

Tad Moses, Agricultural Editor
Betty L. Canavespi, B.S., Assistant Editor—Publications
Herbert O. Evans, B.S., Assistant Editor—News

James W. Potts, M.S., Assistant Editor—News

Helen B. Scott, Assitant Editor—Publications

**Agricultural Economics and Sociology:**

Tyrus R. Timm, D.P.A., Professor and Head of Department (Agricultural Policy)

Harley Bebout, M.S., Associate Professor (Marketing)

Clarence A. Bonnen, M.S., Professor (Farm and Ranch Management)

Robert E. Branson, Ph.D., Professor (Marketing)

Charles W. Brown, M.S., Assistant Professor (Marketing)

Henry V. Courtenay, M.S., Assistant Professor (Marketing)

Vance W. Edmondson, Ph.D., Associate Professor (Farm and Ranch Management)

P. E. Hildebrand, Ph.D., Assistant Professor (Farm and Ranch Management)

Robert L. Hunt, Ph.D., Professor (Marketing)

John A. Kincannon, Ph.D., Associate Professor (Marketing)

John G. McNeely, Ph.D., Professor (Marketing)

Aden C. Magee, M.S., Professor (Farm and Ranch Management)

Jarvis E. Miller, Ph.D., Associate Professor (Marketing)

Clarence A. Moore, M.S., Associate Professor (Marketing)

Donald S. Moore, Ph.D., Assistant Professor (Farm and Ranch Management)

Bardin H. Nelson, Ph.D., Professor (Sociology)

Robert L. Skrabanek, Ph.D., Professor (Sociology)

Houston E. Smith, M.S., Junior Economist (Marketing)

Harold B. Sorensen, Ph.D., Associate Professor (Marketing)

Randall Stelly, Ph.D., Associate Professor (Marketing)

Bob H. Stone, M.S., Junior Economist, Tyler, Texas (Farm and Ranch Management)

Kenneth R. Tefertiller, Ph.D., Assistant Professor (Farm and Ranch Management)

James M. Ward, M.S., Assistant Professor (Marketing)

Howard S. Whitney, Ph.D., Assistant Professor (Marketing)

Alvin B. Wooten, Ph.D., Associate Professor (Land Economics)

**Agricultural Engineering:**

Price Hobgood, M.S., Professor and Head of Department

William H. Aldred, M.S., Assistant Professor (Farm Power and Machinery)

Billy J. Cochran, B.S., Instructor (Farm Power and Machinery)

Charles M. Hohn, M.S., Assistant Professor (Drainage, Irrigation, and Water Control)

Robert C. Jaska, M.S., Assistant Professor (Farm Electrification)

Otto R. Kunze, M.S., Associate Professor (Farm Structures)

William E. McCune, M.S., Professor (Farm Electrification)

Nat K. Person, Jr., M.S., Instructor (Crop Drying, Storing, and Processing)

Ernest T. Smerdon, Ph.D., Associate Professor (Soil and Water)

Jerome W. Sorenson, Jr., M.S., Professor (Crop Drying, Storing, and Processing)

Billy R. Stewart, M.S., Assistant Professor (Farm Structures)

Dennis R. Stipe, B.S., Instructor (Farm Electrification)

Lambert H. Wilkes, M.S., Associate Professor (Farm Power and Machinery)

**Agronomy:**

William O. Trogdon, Ph.D., Professor and Head of Department

Irvin M. Atkins, Ph.D., Agronomist (Small Grains)

J. H. Barton, B.S., Soil and Water Conservation Specialist

W. F. Bennett, Ph.D., Agricultural Chemist (Soil Laboratory)

S. G. Black, M.S., Associate Cotton Specialist (Cotton)

Morris E. Bloodworth, Ph.D., Associate Professor (Soil Physics)

Anton J. Bockholt, M.S., Instructor (Corn Breeding)

John Box, B.S., Agronomist (Fertilizers)

Meta S. Brown, Ph.D., Professor (Cotton Cytogenetics)

Augustus G. Caldwell, Ph.D., Associate Professor (Fertility Investigation)

Lee C. Coffey, Ph.D., Professor and Agronomist (Foundation Seed)

Jesse W. Collier, Ph.D., Associate Agronomist (Corn Investigation)

Fred C. Elliott, M.S., Agronomist (Cotton)

John E. Endrizzi, Ph.D., Assistant Professor (Cytogenetics)

Flake L. Fisher, Ph.D., Associate Professor (Fertilizers)

Curtis L. Godfrey, Ph.D., Associate Professor (Soil Classification)

Billy Wayne Hipp, B.S., Instructor (Soil Analysis)

R. J. Hodges, Jr., B.S., Agronomist (General Agronomy)

Ethan C. Holt, Ph.D., Professor (Grasses)

Jack G. King, M.S., Assistant Agronomist, Lubbock, Texas

Nicholas W. Kramer, Ph.D., Associate Agronomist, Lubbock, Texas (Sorghums)

George W. Kunze, Ph.D., Associate Professor (Soil Mineralogy)

John A. Long, M.S., Instructor (Turf)

George G. McBee, M.S., Pasture Specialist (Pastures)

Robert B. Metzer, M.S., Instructor

George A. Niles, Ph.D., Assistant Professor (Plant Breeding)

Paul E. Pawlisch, Ph.D., Assistant Professor (Cereal Crops)

Lynn P. Pittard, B.S., Assistant Soil and Water Conservation Specialist

Alexander Pope, Ph.D., Assistant Agronomist, Bushland, Texas (Soils)

Kenneth B. Porter, Ph.D., Agronomist, Bushland, Texas (Wheat Breeding)

Homer E. Rea, B.S., Associate Professor (Weed Control)

Robert G. Reeves, Ph.D., Professor (Genetics)

Darrell T. Rosenow, M.S., Instructor (Sorghum)

Ben R. Spears, M.S., Agronomist (General Agronomy)

Raymond D. Staten, Ph.D., Assistant Professor (Legumes)

E. M. Trew, M.S., Agronomist (Pastures)

Harvey J. Walker, M.S., Agronomist, Lubbock, Texas
Eli L. Whiteley, Ph.D., Associate Professor (Soil Physics)
T. G. White, M.S., Instructor (Cotton Breeding)

**Animal Husbandry:**

Ogbourne D. Butler, Ph.D., Professor and Head of Department
William T. Berry, Ph.D., Assistant Professor (Beef Cattle Nutrition)
Thomas C. Cartwright, Ph.D., Professor (Animal Breeding)
Stanley P. Davis, Wool and Mohair Technician (Wool and Mohair)
William C. Ellis, Ph.D., Assistant Professor (Ruminant Nutrition)
Fred Hale, M.S., Professor (Swine Nutrition)
John H. Jones, B.S., Professor (Feeding Investigations)
General T. King, Ph.D., Associate Professor (Meats Investigation)
John T. Morrow, Ph.D., Instructor (Physiology of Reproduction)
Charles F. Parker, M.S., Instructor (Sheep and Goats)
John K. Riggs, M.S., Professor (Beef Cattle Investigation)
Anton M. Sorensen, Jr., Ph.D., Associate Professor (Physiology of Reproduction)

**Biochemistry and Nutrition:**

Carl M. Lyman, Ph.D., Professor and Head of Department (Proteins and Amino Acids)
N. R. Bottino, Ph.D., Post Doctoral Fellow
Bennie J. Camp, Ph.D., Associate Professor (Poisonous Plants)
J. R. Couch, Ph.D., Professor (Poultry Nutrition)
Julius W. Dieckert, Ph.D., Associate Professor
Harriott O. Kunkel, Ph.D., Professor (Large Animal Nutrition, Metabolism)
Carter C. Litchfield, Assistant Professor
N. L. Murty, Ph.D., Post Doctoral Fellow
John M. Prescott, Ph.D., Professor (Microorganisms Assays, Bacterial Metabolism)
Raymond Reiser, Ph.D., Professor (Fat Metabolism, Insect Nutrition)
Luther R. Richardson, Ph.D., Professor (Vitamins, Requirements, and Utilization)

**Dairy Science:**

Isaac W. Rupel, Ph.D., Professor and Head of Department (Dairy Production)
Murray A. Brown, Ph.D., Assistant Professor (Dairy Production)
Rudolph E. Leighton, Ph.D., Professor (Dairy Production)
Albert V. Moore, Ph.D., Professor (Dairy Manufactures)
Isaac I. Peters, Ph.D., Associate Professor (Dairy Manufactures)
Carl Vanderzant, Ph.D., Associate Professor (Dairy Manufactures)

**Entomology:**

J. C. Gaines, Ph.D., Professor and Head of Department
Perry L. Adkisson, Ph.D., Associate Professor (Cotton Insects)

Alfred H. Alex, B.S., Associate Professor (Apiculture)

James R. Brazzel, Ph.D., Associate Professor (Cotton Insects)

Claude J. Burgin, B.S., Chief Foulbrood Inspector and State Entomologist (Foulbrood Control)

Horace R. Burke, Ph.D., Assistant Professor (Insect Taxonomy)

Ralph L. Hanna, Ph.D., Associate Professor (Cotton Insects)

Donald R. King, Ph.D., Associate Professor (Pecan and Fruit)

Willis L. Owen, Jr., M.S., Associate Entomologist, Lubbock, Texas (Cotton Insects)

Manning A. Price, M.S., Associate Professor (External Parasites)

Neal M. Randolph, M.S., Associate Professor (Legume Insects)

Henry J. Reinhard, B.S., Professor Emeritus (Insect Taxonomy)

A. L. Scales, B.S., Entomologist (Cotton Insects)

Oliver E. Shipp, M.S., Assistant Professor

James K. Walker, Jr., M.S., Assistant Professor (Cotton Insects)

James N. Weaver, Ph.D., Associate Professor (Apiculture)

**Floriculture:**

A. F. DeWerth, M.S., Professor and Head of Department (Floriculture)

Richard E. Odom, M.S., Assistant Professor (Floriculture)

David A. Pate, M.S., Instructor (Floriculture)

**Genetics:**

Chauncey B. Godbey, M.S., Professor and Head of Department (Genetics and Biometry)

James D. Smith, Ph.D., Assistant Professor (Genetics and Plant Breeding)

**Home Economics:**

Florence W. Low, M.S., Professor and Head of Department

Sylvia Cover, Ph.D., Professor (Food and Nutrition)

Phyllis Drake, M.S., Assistant Professor (Marketing)

Robert L. Hotstetler, M.S., Instructor (Food and Nutrition)

Sanford J. Ritchey, Ph.D., Assistant Professor (Food and Nutrition)

Alice C. Stubbs, Ph.D., Assistant Professor (Marketing)

**Horticulture:**

Fred R. Brison, M.S., Professor and Acting Head of Department

Homer T. Blackhurst, Ph.D., Professor (Vegetable Breeding and Testing)

Eugene E. Burns, Ph.D., Associate Professor (Processing and Post Harvest Physiology)

Effin T. Graham, Assistant Professor

Hubert C. Mohr, Ph.D., Associate Professor (Vegetable Culture and Breeding)

Donald R. Paterson, Ph.D., Associate Horticulturist (Nutrition, Vegetables, and Fruit)

Durwood E. Speights, B.S., Assistant Professor

James B. Storey, Ph.D., Assistant Professor (Fruits and Nuts)

**Plant Physiology and Pathology:**

David W. Rosberg, Ph.D., Professor and Head of Department (Plant Physiology)

Jagdish V. Amin, Ph.D., Post Doctoral Fellow (Plant Physiology)

Lee J. Ashworth, Jr., Ph.D., Assistant Professor (Plant Pathology)

Luther S. Bird, Ph.D., Associate Professor (Plant Pathology)

Walter W. Heck, Ph.D., Associate Professor (Plant Physiology)

Howard E. Joham, Ph.D., Professor (Plant Physiology)

F. R. H. Katterman, Ph.D., Assistant Professor (Plant Physiology)

Harry C. Lane, Ph.D., Associate Professor, Lubbock, Texas (Plant Physiology)

Charles S. Miller, Ph.D., Assistant Professor (Plant Physiology)

Walter H. Thames, Jr., Ph.D., Associate Professor (Plant Nematology)

**Poultry Science:**

John H. Quisenberry, Ph.D., Professor and Head of Department (Poultry Breeding and Administration)

Robert L. Atkinson, Ph.D., Assistant Professor (Turkey Feeding and Breeding)

John W. Bradley, Farm Superintendent (Poultry Center Operation and Management)

James R. Couch, Ph.D., Professor (Poultry Nutrition)

Ronald E. Davis, Ph.D., Assistant Professor (Poultry Nutrition)

Charles W. Deyoe, Post Doctoral Fellow

Bill H. Doran, B.S., Instructor

George H. Draper, B.S., Poultry Supervisor (National Poultry Improvement)

Roy C. Fanguy, Ph.D., Assistant Professor (Blood Antigen Laboratory)

Thomas M. Ferguson, Ph.D., Associate Professor (Histopathology)

Frederick A. Gardner, Ph.D., Assistant Professor (Marketing Technology)

Edmond L. Kosarek, B.S., Poultry Supervisor (National Poultry Improvement)

Willie F. Krueger, Ph.D., Professor (Incubation, Breeding, and Population Genetics)

Edward D. Parnell, M.S., Professor (Poultry Marketing)

Cecil B. Ryan, M.S., Assistant Professor (Poultry Breeding and Rearing)

Joe N. Wakefield, B.S., Poultry Supervisor (National Poultry Improvement Plan)

**Range and Forestry:**

Charles L. Leinweber, Ph.D., Professor and Head of Department (Range Management)

Robert A. Darrow, Ph.D., Professor (Brush Control)

F. W. Gould, Ph.D., Associate Professor and Agrostology Curator

Robert H. Haas, M.S., Assistant Professor (Brush Control)

Donald L. Huss, Ph.D., Assistant Professor (Grazing Management)

Wayne G. McCully, Ph.D., Associate Professor (Grassland Management)

Omer E. Sperry, Ph.D., Professor (Poisonous Range)

**Farm Service:**

James E. Roberts, M.S., Farm Manager

Freddie A. Wolters, M.E., Superintendent

**State Chemist:**

Joseph F. Fudge, Ph.D., Professor and State Chemist (Soil Chemistry)

Herman F. Beckman, Ph.D., Associate State Chemist (Pesticides)

Ewing E. Brown, M.S., Research Scientist

Cecil H. Dickson, M.S., Research Scientist (Analytical Chemistry)

**Assistant Director for Veterinary Research:**

Alvin A. Price, D.V.M., M.S., Assistant Director for Veterinary Research and Dean of Veterinary Medicine (Anatomy)

Ivan B. Boughton, D.V.M., Professor (Pathology)

**Veterinary Medicine and Surgery:**

Melvin R. Calliham, D.V.M., Professor and Head of Department (Veterinary Medicine and Surgery)

Harold E. Redmond, D.V.M., Professor (Veterinary Medicine and Surgery)

**Veterinary Microbiology:**

Leland C. Grumbles, D.V.M., M.S., Professor and Head of Department (Microbiology)

Joseph N. Beasley, D.V.M., M.S., Associate Professor (Pathology)

Charles H. Bridges, D.V.M., Ph.D., Professor (Pathology)

Lamar H. Carroll, Instructor (Microbiology)

James R. Dixon, M.S., Instructor (Biologist)

Archie I. Flowers, D.V.M., M.S., Associate Professor (Poultry Pathologist)

Ted E. Franklin, D.V.M., M.S., Associate Professor (Veterinary Microbiology)

Charles F. Hall, D.V.M., M.S., Associate Professor (Poultry Pathologist)

Fred C. Heck, Jr., B.S., Instructor

John W. Huff, D.V.M., Instructor (Veterinary Microbiology)

Richard W. Moore, D.V.M., M.S., Assistant Professor (Veterinary Microbiology)

**Veterinary Parasitology:**

Richard D. Turk, D.V.M., M.S., Professor and Head of Department (Veterinary Parasitology)

Rurel R. Bell, D.V.M., M.S., Assistant Professor (Veterinary Parasitology)

Thomas J. Galvin, D.V.M., M.S., Assistant Professor (Veterinary Parasitology)

**Wildlife Management:**

W. B. Davis, Ph.D., Professor and Head of Department (Mammalogy, Herpetology, Ecology)

Richard Baldauf, Ph.D., Associate Professor (Fishery Biology Herpetology)

Richard B. Davis, Ph.D., Associate Professor (Ecology, Biometry)

Robert L. Spicer, M.S., Instructor (Ecology)

Olof C. Wallmo, Ph.D., Associate Professor (Ecology, Wildlife Management)

## SUBSTATIONS

**Number 1—Beeville:**

Edward M. Neal, B.S., Superintendent
Jack R. Gipson, M.S., Assistant Agronomist
Lucas Reyes, Junior Agronomist

**Number 2—Tyler:**

Paul R. Johnson, M.S., Superintendent
Shannon E. Carpenter, B.S., Associate Dairy Husbandman
Harry F. Morris, M.S., Horticulturist
Bob H. Stone, M.S., Junior Economist

**Number 3—Angleton:**

James C. Smith, M.S., Superintendent
George E. Cauthen, D.V.M., M.S., Associate Veterinarian
James B. Henson, D.V.M., M.S., Assistant Veterinarian (On leave)
Brook E. Jeter, Jr., M.S., Assistant Agronomist
Marvin E. Riewe, M.S., Assistant Agronomist

**Number 4—Beaumont:**

Lloyd E. Crane, Ph.D., Superintendent
Clarence C. Bowling, M.S., Assistant Entomologist
Nathan S. Evatt, M.S., Associate Agronomist
William B. Gay, B.S., Training Consultant
Harry R. Hudgins, M.S., Assistant Agronomist
French W. Reaves, B.S., Farm Supervisor
John E. Scott, M.S., Assistant Agronomist
James W. Stansel, M.S., Assistant Geneticist
Ralph M. Weihing, Ph.D., Agronomist
John R. Wood, M.S., Assistant Agronomist

**Number 5—Temple:**

Richard M. Smith, Ph.D., Superintendent
E. L. Clark, B.S., Assistant Agronomist
Elton D. Cook, Ph.D., Agronomist
Ralph J. Hervey, M.S., Assistant Plant Pathologist

**Number 6—Denton:**

Daniel I. Dudley, B.S., Superintendent
James H. Gardenhire, M.S., Assistant Agronomist
Pat A. Rich, M.S., Junior Agronomist
Charles O. Spence, M.S., Associate County Agent and Assistant Agronomist

**Number 7—Spur:**

Paul T. Marion, M.S., Superintendent
William P. Hatchett, B.S., Junior Agronomist

Eugene E. Hughes, M.S., Assistant Range Specialist
Earl D. Robison, B.S., Assistant Agronomist
William J. Waldrip, M.S., Assistant Range Specialist

**Number 8—Lubbock:**

Charles E. Fisher, M.S., Superintendent
Thomas E. Haddox, Jr., B.S., Junior Agronomist
Donald L. Jones, Agronomist Emeritus
Robert E. Karper, Ph.D., Agronomist Emeritus
Jack G. King, M.S., Assistant Agronomist
Harry C. Lane, Ph.D., Associate Professor (Plant Physiology)
James S. Newman, M.S., Assistant Agronomist (Irrigation)
W. L. Owen, Jr., M.S., Associate Entomologist
Levon L. Ray, M.S., Assistant Agronomist
Harvey J. Walker, M.S., Assistant Agronomist

**Number 9—Trans-Pecos:**

**Livestock Unit**
Aurelious A. Melton, M.S., Associate Animal Husbandman

**Soils and Crops Unit**
Earnest L. Thaxton, Jr., M.S., Associate Agronomist

**Number 12—Chillicothe:**

John R. Quinby, M.S., Superintendent and Agronomist
Keith A. Lahr, B.S., Assistant Agronomist

**Number 14—Sonora:**

William T. Hardy, D.V.M., Superintendent
Fred R. Campbell, M.S., Assistant Animal Husbandman
Oscar L. Carpenter, Junior Animal Husbandman
Charles L. Livingston, Jr., D.V.M., Assistant Veterinarian (On leave)
Leo B. Merrill, Ph.D., Associate Range Management

**Number 15—Weslaco:**

Walter R. Cowley, M.S., Superintendent
Jack C. Bailey, B.S., Junior Entomologist
Charles A. Burleson, M.S., Associate Agronomist
Runaldo T. Correa, M.S., Assistant Horticulturist
Herbert A. Dean, M.S., Associate Entomologist
Cleveland J. Gerard, Ph.D., Associate Soil Physicist
Louis W. Getzin, Ph.D., Associate Entomologist
Jack L. Hubbard, M.S., Associate Agronomist
Paul W. Leeper, M.S., Associate Horticulturist
Norman P. Maxwell, M.S., Associate Horticulturist

Michael F. Schuster, B.S., Assistant Entomologist
Bailey Sleeth, Ph.D., Pathologist

**Number 16—Iowa Park:**

Lester E. Brooks, B.S., Superintendent
Virgil I. Woodfin, B.S., Junior Horticulturist

**Number 17—Ysleta:**

Paul J. Lyerly, Ph.D., Research Coordinator Trans-Pecos Area and Superintendent
James J. Hefner, M.S., Assistant Plant Pathologist
D. S. Logan, Jr., B.S., Junior Animal Husbandman
Donald E. Longenecker, Ph.D., Associate Agronomist

**Number 18—Prairie View:**

John C. Williams, M.S., Professor and Superintendent
Roscoe W. Lewis, Ph.D., Professor
Oliver E. Smith, M.S., Assistant Professor
Johnnie J. Woods, M.S., Assistant Professor

**Number 19—Winter Haven:**

Bruce A. Perry, Ph.D., Superintendent
Gordon A. Buffington, B.S., Assistant Horticulturist
John M. Creel, Jr., B.S., Assistant Agronomist
James A. Harding, M.S., Assistant Entomologist

**Number 20—Stephenville:**

Byron C. Langley, M.S., Superintendent
Tom E. Denman, B.S., Associate Horticulturist

**Number 21—Gonzales:**

Arthur A. Camp, Ph.D., Superintendent
Hugh T. Cartrite, D.V.M., Associate Poultry Pathologist

**Number 23—McGregor:**

Henry O. Hill, B.S., C.E., Superintendent
William H. Carter, Accountant
Walter E. Kruse, M.S., Assistant Animal Husbandman
Milton J. Norris, M.S., Agronomist
J. Maurice Shelton, Ph.D., Associate Animal Husbandman and Geneticist
Olin J. Tippitt, B.B.A., Farm Superintendent

**Animal Disease Investigations, West Texas:**

James W. Dollahite, D.V.M., Associate Veterinarian (On leave)
Thomas J. Allen, M.A., Assistant Range Specialist

**Dairy Investigations, Titus County:**
John A. Lancaster, M.S., Associate Agronomist and Project Supervisor

**East Texas Pasture Investigations, Lufkin:**
Elton K. Crouch, B.S., Associate Animal Husbandman, In Charge

**Fruit Investigations, Montague:**
Uriel A. Randolph, M.S., Associate Horticulturist

**Plant Disease Investigations, Yoakum:**
Arthur L. Harrison, Ph.D., Plant Pathologist
Thurman E. Boswell, M.S., Assistant Plant Pathologist

**Poultry Disease Laboratory:**
Robert J. Kilgore, Associate Pathologist

**Poultry Disease Investigations, East Texas:**
Robert L. Clifford, Jr., D.V.M., Associate Poultry Pathologist

**Texas College of Arts and Industries, Citrus and Vegetable Training Center:**
Percy W. Rohrbaugh, Ph.D., Professor and Project Director
Richard A. Hensz, M.S., Instructor
Robert F. Leyden, Ph.D., Assistant Professor
Rex B. Reinking, M.S., Instructor

**Texas Technological College:**
Clark Harvey, Ph.D., Associate Professor (Agronomy)
Chester C. Jaynes, M.S., Assistant Professor (Agronomy)
John W. Thomas, Ph.D., Assistant Professor (Agricultural Economics)

**Tomato Disease Investigations, Jacksonville:**
Paul A. Young, Ph.D., Plant Pathologist

**Big Spring Field Station, Big Spring:**
Earl Burnett, Ph.D., Superintendent (USDA-SWCRD) (Soil Scientist)
Norman H. Welch, M.S., Soil Scientist (USDA-SWCRD)

**U. S. D. A. Southwestern Great Plains Field Station:**
Charles E. Van Doren, B.S., Superintendent (USDA-SWCRD)
Norris E. Daniels, M.S., Associate Entomologist
George F. Ellis, Jr., B.S., Assistant Animal Husbandman
Alexander Pope, Ph.D., Agronomist
Kenneth B. Porter, Ph.D., Agronomist
Allen F. Wiese, Ph.D., Agronomist

**Blacklands Experimental Watershed, Riesel:**
Ralph W. Baird, M.S., Project Supervisor (USDA-SWCRD)

## THE TEXAS AGRICULTURAL EXTENSION SERVICE

### Headquarters Staff (As of December 1, 1960)

**Administration:**

John E. Hutchison, M.S., Director
J. D. Prewit, B.S., Associate Director
W. N. Williamson, D.P.A., Assistant Director
D. C. Pfannstiel, Ph.D., Assistant Director
Gladys Martin, B.S., State Home Demonstration Agent
V. G. Young, B.S., State Agricultural Agent
Maurine Hearn, B.S., State Home Demonstration Leader
A. H. Walker, M.S., State Agricultural Leader
C. H. Doerge, B.S., Executive Assistant

**Information:**

Tad Moses, Agricultural Editor
Thomas Bishop, Artist
Betty Canavespi, B.S., Assistant Editor—Publications
Robert H. Cullen, Artist
Herbert O. Evans, B.S., Assistant Editor
Irene Gromatzky, M.A., Assistant Editor—Home Economics
R. B. Hickerson, Radio Editor
Mrs. Dorothy Holland, B.S., Assistant Editor—Publications
A. B. Kennerly, M.S., Assistant Editor
Joan Moore, B.F.A., Artist
J. W. Potts, M.S., Assistant Editor
J. T. Sloan, M.S., Visual Aids Specialist

**Studies and Training:**

Ben D. Cook, Ph.D., Studies and Training Specialist

**Reports:**

Kate Adele Hill, Ph.D., Reports Analyst

**4-H Club:**

Floyd D. Lynch, M.Ed., State 4-H Club Leader
Marshall E. Crouch, B.S., Assistant State 4-H Club Leader
Peggy Wilsford, B.S., Assistant State 4-H Club Leader
Erma Wines, B.S., Assistant State 4-H Club Leader

**Home Economics:**

Mrs. Florence Low, M.S., Head of Department of Home Economics
Wanda Barkley, M.S., Specialist in Home Management
Beulah Blackwell, B.S., District Agent, District 12

Rheba Boyles, M.A., Clothing Specialist
Margaret Bracher, M.S., District Agent, District 9
Thelma Casey, B.S., District Agent, District 7
Mrs. Gwendolyne Clyatt, B.S., Specialist in Consumer Marketing Information
Lida Cooper, District Agent, District 4
Mary Cothran, B.S., Assistant District Agent
Bonnie Cox, M.Ed., Organization Specialist
Maeona Cox, M.S., Foods and Nutrition Specialist
Mrs. Tom Joyce Cunningham, B.S., Area Home Management Specialist, District 3 and 4
Fannie Brown Eaton, M.A., Clothing Specialist
Graham Hard, Ph.D., Clothing Specialist
Fern Hodge, B.S., District Agent, District 3
Mrs. Eloise Johnson, M.A., Specialist in Family Life Education
Mrs. Roberta Johnson, B.S., District Agent, District 6
Mrs. Gladys Kolander, M.S., District Agent, District 5
Annie Lucy Lane, B.S., District Agent, District 8
Louise Mason, M.S., Foods and Nutrition Specialist
Lucille Moore, M.S., Recreation Specialist
Mrs. Doris Myers, B.S., Area Home Management Specialist, Districts 8 and 11
Mrs. Eula Newman, M.H.E.Ed., Specialist in Home Management
Mrs. Minna Perry, B.S., Area Home Management Specialist, Districts 10 and 12
Frances Reasonover, M.A., Foods and Nutrition Specialist
Mrs. Aubrey Russell, M.A., District Agent, District 2
Mrs. Laura Russell, M.S., Specialist in Housing and Home Furnishings
Mrs. Elsie Short, M.A., Specialist in Home Management
Charlotte Tompkins, M.Ed., Specialist in Housing and Home Furnishings
Marie Tribble, M.S., Foods and Nutrition Specialist
Johnnie Lou Weatherly, B.S., Area Home Management Specialist, Districts 5 and 9
Mildred Webb, B.S., Area Home Management Specialist, Districts 1 and 2
Leota White, B.S., District Agent, District 11
Claudia Williams, M.S., District Agent, District 10
Edith Lois Wilson, B.S., District Agent, District 1

**Agriculture:**

William S. Allen, B.S., Agricultural Engineer
Charles K. Baker, M.S., Economist in Farm Organizations
Jack H. Barton, B.S., Specialist in Soil and Water Conservation
Clifton H. Bates, M.S., Farm Management Specialist
Floyd Z. Beanblossom, M.S., Poultry Marketing Specialist
William F. Bennett, Ph.D., Soil Chemist
Lloyd W. Bergsma, B.S., Livestock Marketing Specialist
S. Glenn Black, M.S., Associate Cotton Specialist

John Box, B.S., Assistant Agronomist
Reagan V. Brown, M.S., Rural Sociologist
Larry L. Burleson, M.S., Organization Specialist
Russell G. Burwell, B.S., District Agent, District 8
Alfred D. L. Byrd, M.S., Area Farm Management Specialist, District 11
Shannon E. Carpenter, B.S., Area Dairy Specialist
William O. Cawley, M.S., Assistant Poultry Husbandman
Robert G. Cherry, M.A., Economist—Management and Policy
Lee C. Coffey, Ph.D., Agronomist
Edwin H. Cooper, B.S., Specialist in Wildlife Conservation
James W. Davis, Jr., B.S., Dairy Specialist
Fred C. Elliott, M.S., Cotton Specialist
Connie F. Garner, M.S., Associate Entomologist
Joseph M. Glover, Jr., B.S., District Agent, District 10
James A. Gray, M.S., Animal Husbandman
William W. Grisham, Jr., B.S., District Agent, District 1
Billy C. Gunter, B.S., Area Agronomist
Bluefford G. Hancock, M.S., Horticulturist
R. J. Hodges, Jr., B.S., Agronomist
Garlyn O. Hoffman, M.S., Range Specialist
Roy Lee Huckabee, B.S., District Agent, District 7
Robert L. Hunt, Jr., M.S., Area Resource Development Specialist
Thomas K. Hunter, M.S., Area Farm Management Specialist, District 3
Jack E. Jenkins, B.S., Area Farm Management Specialist, District 4
Sidney L. Jenkins, M.S., Area Farm Management Specialist, District 8
Joe C. Johnson, M.S., Area Farm Management Specialist, District 10
John H. Jones, B.S., Animal Husbandman
Welton H. Jones, B.S., District Agent, District 2
Carroll W. Keese, M.S., Agricultural Engineer—Irrigation
Robert H. Kensing, B.S., Area Farm Management Specialist, District 7
Robert C. Lambe, Ph.D., Area Specialist in Plant Pathology
Ripley S. Loftis, B.S., Area Resource Development Specialist, District 5
George G. McBee, M.S., Pasture Specialist
John G. McHaney, M.S., Economist
Lawrence A. Maddox, Jr., B.S., Animal Husbandman
James I. Mallett, B.S., Area Farm Management Specialist, District 5
Ted Martin, B.S., District Agent, District 4
Archie M. Meekma, M.S., Dairy Specialist
Marshall M. Miller, M.S., Associate Poultry Marketing Specialist
Clarence J. Murphrey, M.S., Area Farm Management Specialist, District 1
Weldon H. Newton, M.S., Assistant Entomologist
Cecil A. Parker, M.S., Farm Management Specialist
Carol M. Patterson, D.V.M., Veterinarian
Lynn P. Pittard, B.S., Assistant Soil and Water Conservation Specialist

James E. Poore, Assistant District Leader Rodent Control Service
Thomas E. Prater, M.S., Farm Management Specialist
Joseph Neal Pratt, Ph.D., Area Agronomist, Districts 10 and 12
Bobby Joe Ragsdale, M.S., Associate Range Specialist
Beverly G. Reeves, B.S., Cotton Ginning and Mechanization Specialist
Joseph H. Rothe, B.S., District Agent, District 12
Walter L. Scott, B.S., District Agent, District 9
John J. Seibert, M.S., Area Farm Management Specialist, District 2
Frank W. Sheppard, M.Ed., Resource Development Specialist
David W. Sherrill, B.S., Area Irrigation Specialist, Districts 1 and 2
Raymond D. Siegmund, B.S., District Agent, District 6
James G. Simmons, B.S., District Agent, District 3
Clyde C. Singletary, Ph.D., Horticulturist—Vegetables
Harlan E. Smith, Ph.D., Plant Pathologist
William A. Smith, B.S., Forestry Specialist
Roy W. Snyder, M.S., Meats Specialist
Ben R. Spears, M.S., Agronomist
Charles O. Spence, M.S., Area Agronomist, District 4
Paul R. Stebbins, B.S., Area Farm Management Specialist, District 9
John H. Surovik, B.S., District Agent, District 5
Thomas D. Tanksley, Jr., M.Ed., Animal Husbandman
Charles A. Taylor, B.S., Area Farm Management Specialist, District 6
John G. Thomas, B.S., Area Entomologist
Uel D. Thompson, M.S., Animal Husbandman
Willie L. Ulich, D.P.A., Agricultural Engineer
James H. Valentine, M.S., Area Soil Chemist
Silver Whitsett, B.S., District Agent, District 11
Benjamin C. Wormeli, M.S., Poultry Husbandman

## THE TEXAS ENGINEERING EXPERIMENT STATION

(This staff listing does not include employees who are also members of the College teaching staff and whose names appear in the General Faculty section of this catalogue.)

F. J. Benson, M.S., Dean of Engineering
G. P. Blevins, B.B.A., Executive Assistant
J. C. Brusse, B.S., Assistant Research Engineer
M. A. Nowak, B.S., Assistant Research Physicist
W. W. Meinke, B.S., Associate Research Chemist
Stanley P. Clark, B.S., Associate Research Engineer
B. D. Deacon, Ph.D., Associate Research Chemist
J. T. Lawhon, B.S., Research Assistant
G. F. Hallett, B.S., Research Assistant
C. E. Neelley, B.S., Assistant Research Engineer

J. R. Bradley, B.S., Associate Research Economist
R. H. Thompson, B.S., Assistant Research Economist
W. R. Shelton, B.B.A., Assistant Research Economist
W. J. Harlan, B.B.A., Assistant Research Economist
H. B. Pace, M.S., Assistant Research Biologist
P. J. A. Zeller, B.S., Assistant Research Engineer
D. D. Drew, M.S., Engineering Computation Specialist
D. Morrison, B.S., Assistant Research Mathematician
J. D. Williams, M.S., Assistant Research Statistician
R. E. Kilmer, M.S., Data Processing Programmer
J. C. Mitchell, B.A., Research Assistant
F. W. Smith, M.S., Operations Chief
S. E. Stephenson, B.S., Assistant Research Engineer
C. A. Polaski, B.S., Research Assistant
L. J. Horn, B.S., Engineering Writer

## THE TEXAS ENGINEERING EXTENSION SERVICE

### Administration:

Bearden, Harold D., Director
B.S., Texas Technological College, 1931; M.A., Texas, 1936

Konecny, Frank J., Executive Assistant
B.S., Agricultural and Mechanical College of Texas, 1927; M.Ed., 1940

Wentrcek, Ernest A., Administrative Assistant

### Vocational Industrial Teacher Education:

Hackney, Basil M., Teacher Trainer
B.B.A., Baylor, 1940; M.Ed., Agricultural and Mechanical College of Texas, 1951

Whiteley, Johnnie B., Teacher Trainer
B.S., East Texas State Teachers College, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1957

Darrow, Malcolm D., Teacher Trainer
B.S., Arizona, 1933

### Supervisory Development Training:

Jonas, Leonard K., Chief Instructor
B.S., Trinity, 1950; M.Ed., Agricultural and Mechanical College of Texas, 1958

Clark, Vergil B., Instructor
B.S., Austin Peay College, 1951; M.S., Tennessee, 1953

Dow, William A., Instructor
B.S., Texas College of Arts and Industries, 1940

Frede, Elmer F., Instructor

Mansfield, Wesley B., Instructor
B.A., Baylor, 1942; M.A., 1951

Matthews, Raymond F., Instructor

Poe, William H., Instructor

**Rural Electric Line Crew Training:**

Kerlick, Edward W., Chief Instructor
Baker, Grayson E., Instructor
Jackson, Kirby N., Instructor
Jones, Billy Jack, Instructor
Rogers, Kenneth E., Instructor
Watson, Troy S., Instructor

**Water and Sewage Works Training:**

Ronhovde, Ivan I., Chief Instructor
Bryan, James R., Instructor
Wilson, James A., Instructor
Mixon, William A., Instructor
B.S., North Texas State College, 1952

**Instructional Materials Service:**

Phipps, D. Bart, Instructional Materials Writer for Piping Trades
Washer, P. Albert, Instructional Materials Writer for Petroleum Refining Industry
B.S., Colorado School of Mines, 1926

**Municipal Electric Employee Training:**

Nauert, Edward F., Instructor

**Police Training:**

Beasley, Wallace D., Chief Instructor
B.S., Abilene Christian College
Powell, Edwin E., Instructor
B.A., Hardin-Simmons, 1932
Betts, David C., Instructor

**Firemen Training:**

Smith, Henry D., Chief Instructor
Bland, James A., Instructor
Dobson, James R., Instructor
Rauch, John R., Instructor
Robinson, Tom W., Instructor
Williams, Paul R., Instructor

**Heavy Construction Equipment Technicians and Operators School:**

Kramer, Anthony L., Chief Instructor
Brannan, Charlie W., Instructor
B.S., LeTourneau Technical Institute, 1949
Jones, Alvin W., Instructor
B.S., North Texas State Teachers College, 1952
Jones, LaRue W., Instructor
Wallace, James L., Instructor

## THE TEXAS TRANSPORTATION INSTITUTE

(This staff listing does not include employees who are also members of the College teaching staff and whose names appear in the General Faculty section of this catalogue.)

F. J. Benson, M.S., Executive Officer
G. P. Blevins, B.B.A., Executive Assistant
C. V. Wootan, M.S., Associate Research Economist
H. G. Meuth, B.S., Research Assistant
C. R. Haning, M.B.A., Research Assistant
J. L. Buffington, M.S., Research Assistant
A. D. Mayfield, B.S., Research Assistant

# THE AGRICULTURAL AND MECHANICAL COLLEGE OF TEXAS

In his address at the opening of the college on October 4, 1876, Governor Richard Coke, first Chairman of the Board of Directors, outlined the following basic philosophy on which this college was founded and on which it has grown:

> "The aim and mission of the Agricultural and Mechanical College of Texas is, while preparing the young men of Texas for the high duties of American citizenship, at the same time to train their intelligence in the methods and appliances of science, and their hands for the skills which shall utilize them in the every day pursuits of life . . . "

For 85 years the College has offered to young men superior opportunities for educational development while at the same time remaining dedicated to the principles of the original founders as expressed by Governor Coke:

> "It has been the constant aim of the board . . . to bring down to the lowest possible figure the cost of an education which shall be at the same time thorough, liberal, and practical . . . "

From its small beginning with six students and a faculty of six professors in 1876, the Agricultural and Mechanical College of Texas has been built into one of the great technical schools of the nation, offering classroom training coordinated with the various extension and research centers established on its campus. Each year over 7,000 young men live on its campus; attend its classes; work in its shops, agricultural centers, and laboratories; study in its libraries; participate in its excellent ROTC program; play in its nationally recognized intramural program; and benefit from the many cultural activities, including religious, of the campus and the community. To them it offers broad opportunities for learning a profession and for developing into men capable of thinking intelligently and reasonably so that they can contribute to the growth of a more enlightened society.

## HISTORICAL SKETCH

The Agricultural and Mechanical College of Texas, like the land grant institutions in other states of the Union, owes its origin to the Morrill Act, which was approved by Congress July 2, 1862. This act provided for the donation of a specified amount of public lands to the several states and territories. Proceeds from the sale of these lands were to constitute a perpetual fund, the principal of which should remain forever undiminished. The interest from this fund was to be used for the support of at least one technological college whose objective must be, without excluding other scientific and classical studies and including military tactics, to teach branches of learning pertaining to agriculture and mechanic arts in order to promote the liberal and practical education of the industrial classes in the various pursuits and professions of life. The Legislature of Texas accepted the provisions of the congressional legislation in 1866, and $174,000 was realized from the sale of lands set aside under the Act. Before the College opened, this fund had grown to $209,000 through the addition of accrued interest.

In April, 1871, the Legislature provided for the establishment of the Agricultural and Mechanical College. A commission created for the purpose of locating the college accepted the offer made by the citizens of Brazos County and located the institution on a tract of 2,416 acres of land in that county. The College was formally opened and instruction began on October 4, 1876. Its educational activities have been enlarged as the need for such expansion became evident. At the present time both undergraduate and graduate instruction are offered not only in the fields of agriculture and engineering but also in liberal arts, science, education, business administration, and veterinary medicine.

## LOCATION

The community of College Station has grown around the Agricultural and Mechanical College of Texas. This town boasts of churches representing the leading denominations, an excellent public school system, and adequate shopping districts to serve its citizens. Nearby Bryan supplements these advantages.

College Station is located 100 miles north of Houston, 100 miles east of Austin, and 170 miles south of Dallas. State highways, Greyhound Bus Lines, and Continental Airlines serve to connect College Station with the rest of the state. Easterwood Field, the College airport, is located approximately two miles from the Campus.

## ACCREDITATION

The Agricultural and Mechanical College of Texas is accredited by the Southern Association of Colleges and Secondary Schools, the Association of Texas Colleges and Universities, and the Texas Education Agency. The curricula in architecture are accredited by the National Architectural Accrediting Board, and the veterinary medicine degree program is accredited by the American Veterinary Medical Association Council on Education. All of the undergraduate engineering curricula leading to a degree are accredited by the Engineers' Council for Professional Development. Other accrediting agencies which have approved programs offered at the College are the American Chemical Society and the American Council on Education for Journalism.

## BUILDINGS AND FACILITIES

The purchase from time to time of additional land adjacent to the original tract has increased the land owned by the College in Brazos County to approximately 5,200 acres. Additional holdings include a 3,192-acre plantation in Burleson County used for experimental purposes and 411 acres in Kimble County for the Junction Adjunct of the Agricultural and Mechanical College of Texas.

The physical plant of the College includes buildings with a total valuation of approximately $29,000,000. Included among these buildings are the Nuclear Science Center, the Data Processing Center, the Memorial Student Center, the Cushing Memorial Library, the Gibb Gilchrist Engineering Library, the Richard Coke Building, the G. Rollie White Coliseum, the All Faiths Chapel, the auditorium, hospital, Y.M.C.A., supply store, office buildings, numerous classroom buildings with laboratory and research facilities for the various departments, and many barns providing facilities for handling the various classes of livestock used in demonstration and laboratory work in the Schools of Agriculture and Veterinary Medicine. Recent additions include the W. T. Doherty Petroleum Engineering Building, the Nuclear Science Center, new wings added to the Physics Building and to the ROTC Building; and the remodeling and air conditioning of several of the older buildings on the campus. A new Plant Sciences Building is to be completed soon. Twenty-three dormitories are located conveniently on the campus, and two dining halls are in operation. In addition to dormitories for single students, the College operates 778 apartments for married students in areas near the campus.

Athletic facilities consist of a stadium, field house and natatorium, baseball diamond and bleachers, golf course, and numerous tennis courts and practice fields.

The value of the physical plant has grown to approximately $50,000,000, and a good foundation has been laid at the College for instruction, for investigation, and for extension by means of financial aid secured from both the Congress and the State Legislature.

## SCHOOLS AND DEPARTMENTS

Academic training at the Agricultural and Mechanical College of Texas is supervised by the Schools of Agriculture, Arts and Sciences, Engineering, Military Sciences, Veterinary Medicine, and the Graduate School. The School of Veterinary Medicine is a degree-granting school, admission to which is obtained only after completion of the program in pre-veterinary medicine and selection within the quota to be admitted for the session under consideration. The ROTC program is under the supervision of the School of Military Sciences. The Graduate School assists graduate students in developing and pursuing individual educational programs. More detailed information concerning its administration and the degrees which may be earned will be found in the Bulletin of the Graduate School.

For administrative purposes the 50 departments and divisions of instruction are assigned to the several schools as follows:

### School of Agriculture

Agricultural Economics and Sociology
Agricultural Education
Agricultural Engineering
Agronomy
Animal Husbandry
Biochemistry and Nutrition
Dairy Science
Entomology
Floriculture
Genetics
Horticulture
Plant Physiology and Pathology
Poultry Science
Range and Forestry
Wildlife Management

### School of Arts and Sciences

Biology
Business Administration
Chemistry
Economics
Education and Psychology
English
Geography
Health and Physical Education
History and Government
Journalism
Mathematics
Modern Languages
Oceanography and Meteorology
Physics

### School of Engineering

Aeronautical Engineering
Architecture
Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Graphics
Geology and Geophysics
Industrial Education
Industrial Engineering
Mechanical Engineering
Nuclear Engineering
Petroleum Engineering

### School of Military Sciences

Air Science
Military Science and Tactics

### School of Veterinary Medicine

Veterinary Anatomy
Veterinary Medicine and Surgery
Veterinary Microbiology
Veterinary Parasitology
Veterinary Pathology
Veterinary Physiology and Pharmacology
Veterinary Public Health

## LIBRARY FACILITIES

**Cushing Memorial Library:** The main College library, which serves also as the research library of the Texas Agricultural Experiment Station and of the Texas Agricultural Extension Service, is in a centrally located, air conditioned building housing a collection of over 300,000 volumes of books, periodicals, government documents, and other library materials.

The library is a federal depository for United States government documents on a selective basis. Over 2,500 periodicals and other serials are currently received, along with 53 state, national, and foreign newspapers. Special attention has been given to obtaining important foreign language periodicals in all areas. Although the library has been developed chiefly along reference and technical lines, a good general reading collection has been assembled. Generous contributions from A. and M. Mothers' Clubs throughout the State have been used to increase substantially the collection of fiction and non-technical popular material. The careful selection of new books in both technical and non-technical areas keeps the collection abreast of modern thought. A well-trained staff of librarians is on duty at all times.

The more important reference works, including indexing and abstracting services, are shelved in the General Reference Room, second floor. Specialized reference materials in science and agriculture are shelved in the Science and Agriculture Reference Room on the same floor. State and federal documents are to be found in the Documents Division, third floor. Microfilm and microcard machines are provided for reading materials in this form.

Individual study carrels are provided in the bookstacks for the use of graduate students and faculty members and may be assigned on a semester basis. With the exception of periodicals, government documents, and certain books temporarily reserved by departments for reference or required reading, all books are loaned for home use for a period of two weeks with the privilege of renewal for the same length of time. Bound volumes of periodicals may be charged out by graduate students for over-night use only.

Normally the library is open from 8 a.m. to 10 p.m., Monday through Friday; Saturday, from 8 a.m. to 12 noon; and Sunday, from 2 p.m. to 10 p.m. On holidays and between terms, the library is open from 8 a.m. to 5 p.m. on weekdays, from 8 a.m. to 12 noon on Saturdays, and is closed on Sundays.

**Texas Engineers Library:** This special branch library, established in 1941 by the Texas State Board of Registration for Professional Engineers in co-operation with the Agricultural and Mechanical College of Texas, is housed in the Gibb Gilchrist Engineering Library Building adjacent to the main college library. The collection consists of over 65,000 volumes of books, perodicals, and other library materials in all areas of engineering. The collection is well balanced but is especially strong in aeronautics, air-conditioning, highway engineering, concrete, hydrology, sanitary engineering, petroleum, and welding. Over 1,400 periodicals and other serials are currently received, including many in foreign languages and some English translations of Soviet technical journals. The library is a depository for all unclassified technical reports of the Atomic Energy Commission.

The library is modern and well-lighted with stacks open to the public. It is open from 8 a.m. to 5 p.m. on weekdays and on Saturdays from 8 a.m. to 12 noon. The library is closed on Sundays.

**Veterinary Library:** This branch library is located at the east end of the first floor of the Veterinary Medicine Building and is open from 8 a.m. to 5 p.m. on weekdays; from 7:30 to 9:30 p.m. on Mondays, Wednesdays, Thursdays, and Fridays; and from 8 a.m. to 12 noon on Saturdays. The library is closed on Sundays. It is primarily a reference library with 9,000 volumes of books and periodicals in the fields covered by the curriculum in the School of Veterinary Medicine. The library subscribes to 387 American and foreign periodicals and receives pertinent publications from other colleges and experiment stations.

**Architecture Library:** This branch library, located on the fourth floor of the Academic Building, furnishes reading room space and offers reference service from 8 a.m. to 5 p.m. daily. It is closed Saturdays and Sundays. The collection, numbering over 4,300 volumes of carefully selected books and periodicals, provides materials in this specialized field for both students and faculty.

**Business Administration Library:** Another branch of the College Library, this collection consists of 3,300 volumes of books and periodicals in the many areas of business administration, such as accounting, insurance, marketing, business law, etc. Over 140 periodicals are currently received, and a file of annual reports of corporations is carefully maintained. The library is located in the west end of the first floor of Francis Hall. It is open from 8 a.m. to 5 p.m. weekdays and is closed Saturdays and Sundays.

**Other Libraries:** Many departments maintain working collections of books and periodicals for use within the departments. Some of the collections are fairly large and well organized; others are small but very well chosen. Use of these libraries is restricted by the departments concerned.

### THE SUMMER SESSION

The Agricultural and Mechanical College of Texas conducts a summer session consisting of two terms of six weeks each for the benefit of both graduate and undergraduate students.

During the summer session courses are offered in most of the departments and are selected to meet the needs of the regular college students. Emphasis is also placed on planning a program for teachers and administrators who wish to do advanced work. A number of departments offer sufficient work for the Master's degree to be earned by attendance during the summer months. Instruction during the summer session is given by members of the A. and M. College faculty and by teachers of prominence from other institutions.

The Agricultural and Mechanical College of Texas is not a coeducational institution. Under present regulations, however, ladies are permitted to attend the summer session as special students, not candidates for degrees.

A separate catalogue for the summer session giving course offerings and other pertinent information is published each spring and is available on request from the Office of the Director of Admissions.

## ADMISSION

### APPLICATION FOR ADMISSION

Any person who desires to apply for admission to the College should write to the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas, for a formal application blank. The applicant should complete the form according to the directions printed thereon and return it to the Admissions Office. If the applicant has attended any other college or university, he must submit a complete, official, and original transcript from each institution previously attended. In such a case, the college transcript will serve in lieu of the high school transcript required of those who have had high school attendance only. It is extremely important that these credentials be submitted in advance of registration. If this cannot be done, the applicant should bring them at the opening of the session. Without the credentials the applicant cannot be admitted, and valuable time will be lost if he has to send for them after arriving at the College.

When admission requirements have been satisfied, the Director of Admissions will then send the applicant a letter of acceptance, a room reservation card, and a physical examination form to be filled out by a physician. The physical examination report must be completed and returned to the Admissions Office prior to the date of registration for classes.

All applicants for admission to the College must be of good moral character, at least sixteen years old, and free from contagious or infectious diseases. Since the Agricultural and Mechanical College of Texas is not a coeducational institution, only men are admitted to the regular session.

A high school student who is eligible for admission to college and who wishes to enter during the summer may well consider the opportunities of combining study and recreation at the Junction Adjunct of the Agricultural and Mechanical College of Texas. Excellent studying, living, and recreational facilities are available at this beautiful Kimble County campsite in the heart of the Texas hill country. Application blanks for admission to the Adjunct may be obtained from the Director of Admissions, Agricultural and Mechanical College of Texas, College Station, Texas.

## METHODS OF ADMISSION

**Of High School Graduates:** An applicant must have graduated from a properly accredited secondary school with a minimum of 15 units (credits) acceptable to the College for entrance purposes. Superior students with unit deficiencies will be considered on the basis of their merit. The applicant who does not meet the above requirement or who falls within the lowest one-fourth of his high school class may be required to make a satisfactory showing on tests prescribed by the College. Generally this means tests given by the College although results of College Entrance Examination Board tests will be acceptable for this purpose.

The 15 acceptable entrance credits shall include four units in English, two units in the social sciences, two units in algebra, one unit in plane geometry, one unit in a natural science, and five acceptable elective units. It is recommended that the five elective units include additional courses from the following subject areas: foreign languages, mathematics, natural sciences, social sciences, and speech. Applicants for admission to engineering and the natural sciences curricula must present trigonometry, one-half unit, in addition to the algebra and plane geometry requirements as stated above. Such applicants are also strongly advised to present one-half unit in solid geometry. Three units in English and two units in a foreign language may be substituted for the four units required in English. Applicants are advised to take biology, chemistry, or physics in satisfying the natural science requirements. More than the minimum of one unit in the natural sciences should be presented if possible.

A maximum of three units from the following subject areas may be used as a part of the elective credits:

| SUBJECT | UNITS | SUBJECT | UNITS |
|---|---|---|---|
| Advanced Mathematics | ½ | Drawing | 1 to 3 |
| Agriculture, General | 1 | Distributive Education | 2 |
| Agriculture, Vocational | 1 to 3 | Home & Family Life | ½ to 1 |
| Art | 1 | Home Making | ½ to 1 |
| Business Artithmetic | ½ to 1 | Journalism | 1 |
| Bible | ½ to 1 | Junior Business Training | 1 |
| Bookkeeping | ½ to 1 | Music | 1 |
| Commercial Geography | ½ | Typing | ½ to 1 |
| Commercial Law | ½ | Shopwork | 1 to 3 |

**By Examination:** Any or all of the scholarship requirements for admission may be met by passing the entrance examinations. These will be held at the beginning of each semester under the supervision of the College authorities and will cover all the subjects required or accepted for admission as outlined above. Candidates desiring to take examinations at the College should notify the Director of Admissions well in advance of registration.

**By Individual Approval:** An applicant over twenty-one years of age who has not recently attended school and who cannot satisfy the entrance requirements in full may be admitted without examination, subject to the following requirements:

1. He must make application on the official entrance blanks.

2. He must furnish evidence that his preparation is substantially equivalent to that required of other applicants and that he possesses the ability and seriousness of purpose necessary to pursue his studies with profit to himself and to the satisfaction of the College.

3. He must show by a test in composition that he has an adequate command of the English language.

4. The candidate should forward his credentials to the Director of Admissions in advance of his coming, but in no case will he be admitted without a personal interview.

A student admitted by individual approval will not be considered a candidate for a degree until he has satisfied the entrance requirements in full.

**Of Superior Students:** Any superior student, as indicated by his entrance tests and his high school record, who presents evidence of outstanding preparation in any subject matter field may be relieved of the introductory course in that field and permitted to substitute another course with the approval of the dean of his school provided he passes a validating examination in the course with a grade of C or better.

**Of College Transfer Students:** Admission to advanced standing may be granted to an applicant who has satisfied the requirements as outlined below:

An applicant who has attended another college or university must be eligible to return to that institution and also must have for each of the last two semesters, or for the total record if less than two semesters of attendance, a grade point ratio of 1.00 (C-average) or better on all courses undertaken.

An official transcript of the record at each college or university previously attended must be submitted.

An applicant is not at liberty to disregard the record of any previous training and gain admission by individual approval or on the basis of a high school record.

On the basis of these credentials, credit will be given for work completed with a grade of C or better, so far as the work is equivalent in character and extent to similar work at A. and M. College. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory. Work completed with a grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the subject area.

An applicant whose record does not meet the minimum admission requirements may be considered upon merit after the student has shown satisfactory performance on tests administered at this college.

It is essential that all credentials be forwarded to the Director of Admissions well in advance of registration day.

Candidates for a baccalaureate degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture will generally be limited to those courses normally taught in the freshman and sophomore years at this institution.

**Of Special Students:** A limited number of young men over twenty-one years of age may be admitted to the College as special students, not candidates for a degree, subject to the following regulations:

1. The applicant must show good reason for not taking a regular course and must submit satisfactory evidence that he is prepared to profit by the special studies he wishes to pursue.

2. Record of his previous scholastic work must be submitted on the official entrance blanks and must be accompanied by a statement showing (1) his experience; (2) a plan of study, enumerating the courses he desires to pursue; and (3) the purpose or end expected to be accomplished by his study.

3. In order to be admitted to the work of any department, a special student must secure the consent of the head of the department; and his course of study as a whole must be approved by the dean concerned.

Special students are subject to the rules and regulations governing regular students.

A special student who may desire to become a candidate for a degree must satisfy the entrance requirements and obtain the consent of the dean concerned.

**Of Nonresident Students:** 1. A limited number of nonresident students who have attended another college or university may be accepted so long as facilities are available. Such students must have maintained a grade point ratio of 1.00 (C-average) or better on all courses undertaken in addition to a grade point ratio of 1.00 (C-average) or better for each of the last two semesters.

2. A limited number of out-of-state high school graduates may be accepted so long as facilities are available. Such students, in addition to satisfying all other admission requirements, must have made superior records in high school.

3. Students who are admitted to the College in one curriculum may not be permitted to change to another which is restricted except under the same conditions as apply to new students.

4. The status of the residence of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. as a student. His residence may not thereafter be changed by him, but, in the case of a minor, it may be changed by his parents, should they move to and become legal residents of the State and maintain such residence for at least one calendar year.

### REGISTRATION

Every student is required to register when he first enters the College and thereafter at the beginning of each semester. Dates of registration for the session of 1961-62 are shown on pages 2-3 of this catalogue.

Registration is not complete until the student pays his fees for the ensuing semester; reports, if not a civilian student, to ROTC headquarters for assignment to an organization; reports to the Chief of Housing for assignment to a room or to report his place of residence if not living in a dormitory; and returns his assignment card, properly approved, to the Registrar's Office, where his receipt showing payment of fees will be stamped "Registered in the Registrar's Office."

## EXPENSES

The expenses for a regular session of nine months will vary with the individual concerned and with the course of study pursued. In the case of new students the total cost should range between $950.00 and $1150.00. In general these amounts include four types of expenses as follows: fees payable to the College Fiscal Department (tuition, student services, student activities, board, room rent, laundry, and room key deposit); textbooks and supplies; clothing, and military uniform to supplement that furnished by the college; and incidental expenses, estimated to range between $100.00 and $200.00 depending upon the individual concerned.

The total expenses for returning students during a regular session should be somewhat less than those amounts indicated for new students.

The fees for board, room, and laundry listed for the session of 1961-62 may be changed during the year if economic conditions make it absolutely necessary.

Fees payable to the Fiscal Department:

| | First Semester to Begin Sept. 15, 1961 | Second Semester to Begin Feb. 2, 1962 |
|---|---|---|
| Tuition (See Note 4) | $ 50.00* | $ 50.00* |
| Student Services (See page 80) | 18.00 | 18.00 |
| Student Activities (See page 80) | 23.80 | † |
| Property Deposit | 10.00 | |
| Board | 178.50 | 174.00 |
| Room Rent | 67.50 | 60.50 |
| Laundry | 13.15 | 13.00 |
| Room Key Deposit, returnable | 1.00 | |
| Total payable to Fiscal Dept. | $361.95 | $315.50 |
| Textbooks and supplies are variable with classes and courses—about | 40.00 | 30.00 |
| Total general expenses—about | $401.95 | $345.50 |

IN ADDITION TO EXPENSES AS OUTLINED ABOVE, the Legislature further requires the payment of laboratory fees which shall reflect the costs of materials and supplies used and which shall be not less than $2.00 nor more than $8.00 per laboratory course.

All fees except room rent, board, and laundry are payable in full at the beginning of the semester; these fees may be paid in installments as shown below. The last three installments for each semester are due on the dates shown below; the fees for delayed payments shall be $1.00 per day extra for each day of delayed payment of fees for board, room rent, and laundry or for any one of these fees. Students who are delinquent five days will be dropped from the rolls.

All members of the cadet corps living in the dormitories are required to pay the fees for board and laundry in addition to the fees for room rent. Students living in the dormitories who are not members of the cadet corps are required to pay the fees for room rent and laundry in addition to the other required fees. Changes from dormitory student to day student will be made only on the last day of installment payments for room, board, and laundry.

INSTALLMENT PAYING: The general expenses listed above may be paid in installments as follows:

### FIRST SEMESTER

1. First installment, payable on entrance, September 15-16

To Fiscal Department:

| | |
|---|---|
| Tuition (See Note 4) | $ 50.00* |
| Student Services (See page 80) | 18.00 |
| Student Activities (See page 80) | 23.80 |
| Property Deposit | 10.00 |
| Board through October 20 | 54.00 |
| Room Rent through October 20 | 18.00 |
| Laundry through October 20 | 3.85 |
| Room Key Deposit, returnable | 1.00 |
| Total payable to Fiscal Department | $178.65 |
| Textbooks and supplies, variable with classes and courses—about | 40.00 |
| General expenses, first installment—about | $218.65 |

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*The tuition for nonresident students is $200.00 per semester.

†For those students who did not pay the optional fee during the first semester the fee is $12.55.

2. Second installment, payable October 1-20
To Fiscal Department:

| | |
|---|---|
| Board through November 21 | $ 48.00 |
| Room Rent through November 21 | 16.00 |
| Laundry through November 21 | 3.40 |
| Total payable to Fiscal Department | $ 67.40 |

3. Third installment, payable November 1-21
To Fiscal Department:

| | |
|---|---|
| Board through December 19 (Thanksgiving recess excluded) | $ 36.00 |
| Room Rent through December 19 | 13.50 |
| Laundry through December 19 | 3.00 |
| Total payable to Fiscal Department | $ 52.50 |

4. Fourth installment, payable December 1-19
To Fiscal Department:

| | |
|---|---|
| Board through January 27 (Christmas recess excluded) | $ 40.50 |
| Room Rent through January 27 | 20.00 |
| Laundry through January 27 (Christmas recess excluded) | 2.90 |
| Total payable to Fiscal Department | $ 63.40 |
| Total general expenses, first semester | $401.95 |

## SECOND SEMESTER

1. First installment, payable on entrance, February 2-3, 1962
To Fiscal Department:

| | |
|---|---|
| Tuition (See Note 4) | $ 50.00* |
| Student Services (See page 80) | 18.00 |
| Student Activities (See page 80) | † |
| Property Deposit | |
| Board through March 13 | 60.00 |
| Room Rent through March 13 | 20.00 |
| Laundry through March 13 | 4.30 |
| Total payable to Fiscal Department | $152.30 |
| Textbooks and supplies, variable with classes and courses—about | 30.00 |
| General expenses, first installment—about | $182.30 |

2. Second installment, payable March 1-13
To Fiscal Department:

| | |
|---|---|
| Board through April 13 | $ 46.50 |
| Room Rent through April 13 | 15.50 |
| Laundry through April 13 | 3.30 |
| Total payable to Fiscal Department | $ 65.30 |

3. Third installment, payable April 1-13
To Fiscal Department:

| | |
|---|---|
| Board through May 10 (Spring recess excluded) | $ 33.00 |
| Room Rent through May 10 | 13.50 |
| Laundry through May 10 | 2.90 |
| Total payable to Fiscal Department | $ 49.40 |

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*The tuition for nonresident students is $200.00 per semester.

†For those students who did not pay the optional fee during the first semester the fee is $12.55.

4. Fourth installment, payable May 1-10
To Fiscal Department:

| | |
|---|---|
| Board through June 2 | $ 34.50 |
| Room Rent through June 2 | 11.50 |
| Laundry through June 2 | 2.50 |
| Total payable to Fiscal Department | $ 48.50 |
| Total general expenses, second semester | $345.50 |

## ADDITIONAL EXPENSES FOR NEW STUDENTS

In addition to the general expenses shown above, new students will have the following expenses when registering for the first time:

| | |
|---|---|
| Uniform (See Note 1.)—about | $ 80.00 |
| Slide rule and drawing instruments for engineering students (See Note 3.) | $35.00 to 40.00 |
| Room key deposit, returnable | 1.00 |
| For new students registering the second semester, February 2, 1962, extra for books and supplies — about | 10.00 |

For new students who report for the first semester on September 12 for New Student Program, add:

| | |
|---|---|
| Board | 4.50 |
| Room Rent | 1.50 |
| Laundry | .30 |

NOTES: 1. Members of the ROTC will be furnished most of their uniform equipment. Cadets will find it necessary to supplement the uniform issued by purchasing the following articles, the approximate cost of which at the College Exchange Store is as follows: one pair of wool elastique O.D. pink trousers ($21.95); two pairs of cotton khaki trousers ($5.95 each); collar ornaments ($2.00); two cotton khaki officer style shirts ($5.45 each); one wool elastique garrison cap ($2.95); one cotton khaki garrison cap ($1.25); and four pairs of black cotton socks ($0.85 per pair). Cadets will pay a handling charge of $8.00 per year to cover the cost of issuing, receiving, and record keeping of uniforms issued. Since only approved articles of uniform may be worn, new students should purchase uniforms after arrival at the College.

To defray the cost of additional billing and delayed handling, a charge of ten per cent of the value of uniform articles turned in subsequent to five days following the close of school, with a minimum charge of $1.00, will be made.

The College operates a store for the purpose of supplying necessary articles to students. The store carries in stock textbooks, stationery, drawing instruments, toilet articles, and other supplies. All merchandise is sold at the usual retail prices prevailing in the area. Upon recommendation of the Exchange Store Advisory Board, any profit created from the operation of the Exchange Store may be used for student welfare and other purposes of benefit to the entire student body.

2. The College will furnish the necessary physical education uniform, except shoes, to all students taking required physical education and to others who wish to use facilities of the Physical Education Department. All such students will be required to pay a handling charge of $8.00 per semester for this service. The handling charge includes the cost of laundering the physical education uniform after each use. Each student will be required to furnish his own shoes (1 pair, canvas, rubber sole). These may be purchased at the College Exchange Store for $5.95.

3. The slide rule is one of the most important time-saving instruments of engineers. For use throughout the college course the LL Decitrig Duplex is suggested. Such a rule costs about $23.75. The cost of the drawing instruments needed by engineering students will range from $9.95 to $12.50 depending on quality.

4. For tuition fee of nonresident students, see paragraph below. Former students who in either semester do not register on the days set apart for that purpose pay an additional tuition fee of $4.00.

5. New students, or former students not in school during the preceding semester, may file room reservation applications beginning June 16 for the first semester; October 16 for the second semester. Each application for a dormitory room reservation must be accompanied by a deposit of $6.00, which will apply on the room rent payable on entrance and for the key deposit. Application blanks for room reservations will be furnished by the Director of Admissions.

## DAY STUDENTS

Day students pay all specified fees and charges except board (optional), laundry, room rent, and room key deposit.

## PART-TIME STUDENTS

The tuition fee for students registering for less than 12 credit hours will be reduced by $4.00 for each credit hour less than 12 with a minimum tuition fee of $15.00.

## NONRESIDENT STUDENTS

The residence status of a student is determined at the time of his first registration in the College, and his residence is not changed by his sojourn at A. and M. College as a student except as provided by law. This policy shall apply to both graduate and undergraduate students regardless of any scholarships, student assistantships, or graduate assistantships that may be granted to any student.

In compliance with the State law, the tuition fee for nonresident students is $200.00 per semester. A nonresident student is hereby defined to be a student of less than twenty-one years of age, living away from his family and whose family resides in another state, or whose family has not resided in Texas for the twelve months immediately preceding the date of registration; or a student of twenty-one years of age or over, who resides out of the State or who has not been a resident of the State twelve months subsequent to his twenty-first birthday or for the twelve months immediately preceding the date of registration. The tuition fee for nonresident students registering for less than 12 credit hours will be reduced by $16.00 for each credit hour less than 12.

The term "residence" as used herein means "domicile" and the term "resided in" means "domiciled in."

The legal residence of one who is under twenty-one years of age is that of the father. Upon death of the father, the legal residence of the minor is that of the mother. Upon divorce of the parents, the residence of the minor is determined by the legal residence of the person to whom custody is granted by the court. In the absence of any grant of custody, the residence of the father continues to control. Upon death of both parents, the legal residence of the minor continues to be that of the last surviving parent until he becomes twenty-one unless he makes his home with his grandparents, whereupon their residence is controlling.

Individuals who have come from without the state of Texas and who register in an educational institution of the State prior to having resided in the State for a period of twelve months shall be classified as nonresident students; and such nonresident student classification shall be presumed to be correct as long as the residence of such individuals in the State is during their attendance at educational institutions, regardless of whether such individuals have become qualified voters, have registered motor vehicles and paid personal property taxes thereon, have obtained Texas drivers' licenses, or have otherwise attempted to establish legal residence within the State.

A student under twenty-one years of age shall not be classified as a resident student until his parents shall have maintained legal residence ("domicile") in this state for at least twelve months. A student under twenty-one years of age whose parents leave the State to reside in another state normally shall be classified immediately as a nonresident student. It shall be the responsibility and duty of the student to submit legal evidence of any change of residence.

Individuals of twenty-one years of age or less whose families have not resided in Texas for the twelve months immediately preceding the date of registration shall be classified as nonresident students regardless of whether such individuals have become the legal wards of residents of Texas or have been adopted by residents of Texas while such individuals are attending educational institutions in Texas or within a year prior to such an attendance or under circumstances indicating that such guardianship or adoption was for the purpose of obtaining status as a resident student.

All individuals who have come from without the state of Texas and who are within the State primarily for educational purposes are classified as nonresidents. Registration in an educational institution in the State is evidence that residence is primarily for educational purposes even though such individuals may have become qualified voters, have become legal wards of residents of Texas, have been adopted by residents of Texas, or have otherwise attempted to establish legal residence within the State.

A student twenty-one years of age or older who comes from without the State and desires to establish a status as a resident student must have resided in the State as a legal resident for a period of at least twelve months and must have the intention of establishing a permanent residence within the State during that entire period.

All aliens shall be classified as nonresident students except that an alien who has applied for naturalization in the United States and has received his first citizenship papers or immigrant cards shall have the same privilege of qualifying as a resident student as a citizen of the United States. The twelve months' residence required to establish the status of a resident student shall not begin until after such first citizenship papers or immigrant cards have been received by the alien.

Officers, enlisted personnel, selectees or draftees of Army, Army Reserve, National Guard, Air Force, Air Force Reserve, Navy, Naval Reserve, or the Marine Corps of the United States who are stationed in Texas by assignment to duty within the borders of this state, shall be permitted to enroll themselves, their husband or wife as the case may be, and their children by paying the tuition fees and other fees or charges provided for regular residents of the state of Texas, without regard to the length of time such officers, enlisted personnel, selectees, or draftees have been stationed on active duty within the State. This provision shall extend only during active military service in Texas; and upon such member of the Armed Services being transferred outside the state of Texas, he and his children shall be classified as to residence under the second paragraph of these regulations. Any student claiming the privilege of this section shall submit at each registration a statement by the commanding officer of the post or station at which he or his parent is on active duty verifying the fact of his or his parent's military status.

The residence of a wife is that of her husband; therefore a woman resident of Texas who marries a nonresident shall be classified as a nonresident and shall pay the nonresident fee for registrations subsequent to her marriage. A nonresident woman student who marries a resident of Texas is entitled to be classified immediately as a resident student and is entitled to pay the resident fee for all subsequent registrations.

Appointment as a member of the teaching or research staffs or the holding of a fellowship, scholarship, or assistantship shall not affect a student's residence status or the tuition fee to be paid.

It shall be the responsibility of the student to pay the correct fee at the beginning of each semester or term for which he may register, and a penalty of $10.00 shall be assessed for failure to pay the proper fee.

The responsibility of registering under the proper residence is placed upon the student, and it is his duty, at or before registration, if there is any possible question of his right to legal residence in Texas under the State law and these regulations, to raise the question with the proper admissions officer and have such question settled prior to registration. Change in residence classification shall be only by the proper admissions officer.

## PAYMENTS

Payments to the Fiscal Department should be made by cashier's check or money order, payable to the Agricultural and Mechanical College of Texas. All checks, money orders, and drafts are accepted subject to final payment.

## REFUNDS

Any student withdrawing officially (a) during the first week of class work in a semester will receive a refund of four-fifths of the tuition fee; (b) during the second week of class work, three-fifths; (c) during the third week of class work, two-fifths; (d) during the fourth week of class work, one-fifth; (e) after the fourth week of class work, nothing. No refunds will be made until ten days have elapsed from the time the fees were paid.

Students withdrawing from a laboratory course during the first week of class work in a semester will receive a refund of 100% of the laboratory fee paid. Students withdrawing from a laboratory course after the first week of class work in a semester shall not be entitled to a refund.

A refund of board and laundry payment will not be made unless there is a consecutive absence of not less than ten days due to illness of the student or a member of his family, or for some other unavoidable cause.

Students withdrawing during the first week of the Fall Semester will receive a 100% refund of the Student Activities fee. Students withdrawing after the first week of the Fall Semester and before the end of the first week of the Spring Semester, will receive a refund of $6.55 and will be entitled to receive a copy of the student annual. Students withdrawing after the first week of the Spring Semester will receive no refund.

Students not enrolled in the first semester and withdrawing during the first week of the Spring Semester will receive a 100% refund of the Student Activities fee. No refund will be made to students withdrawing after the first week, but the student will be entitled to receive a copy of the student annual.

## DEDUCTIONS

No deductions will be made from charges for board, laundry, and room rent in case of entrance within ten days after the opening of a semester, nor will a refund be made in case of withdrawal during the last ten days of a semester or the last ten days for which payment is made.

## UNPAID CHECKS

If a check or draft accepted by the Fiscal Department is returned unpaid by the bank on which it is drawn, the person presenting it will be required to pay a penalty of $1.00.

## DUPLICATE RECEIPTS

Duplicate receipts covering fees paid by students will be issued on payment of twenty-five cents.

## TUITION FEE

The tuition fee, fixed by the State law, includes the cost of necessary classroom supplies and entitles the student to the usual college privileges, including the use of the library.

## AUDITING OR VISITING FEE

The fees for courses audited or visited by students shall be the same as for courses for which credit is given.

## STUDENT SERVICES FEE

The student services fee covers the professional services of the College physician and the hospital staff. Surgical operations and charges for consultations with outside physicians requested by parents are not included.

The student program activities of the Memorial Student Center as well as other services are supported in part by this fee.

## ROOM RENT FEE

Rooms are furnished with single bedsteads, mattresses, tables and chairs, and running water. The charge for room rent also includes heat, light, and cleaning the corridors but not the rooms.

## STUDENT ACTIVITIES FEE

The optional student activities fee includes subscription to the Battalion newspaper, the College annual, and the magazine of the student's particular school as well as admission to the Town Hall program, the Great Issues and Recital Series, and to all athletic events held at College Station under the auspices of the Athletic Department.

## VOCATIONAL REHABILITATION AID

The Texas Education Agency, through the Vocational Rehabilitation Program, offers assistance for tuition and required fees to students in Texas colleges who have certain physical disabilities, provided the vocational objective selected by the student has been approved by a representative of the Division.

Assistance for this phase of the program of vocational rehabilitation is based on physical disabilities resulting in a vocational handicap.

Application for Vocational Rehabilitation should be made to the Division of Vocational Rehabilitation, Room 505, Varisco Building, Bryan, Texas, or to C. G. Fairchild, Director, Division of Vocational Rehabilitation, Capitol Station, Austin, Texas.

# SCHOLARSHIPS, FELLOWSHIPS, AND AWARDS

The scholarship program is administered by a permanent committee known as the Faculty Committee on Scholarships. As authorized by the Board of Directors, this committee is composed of the Dean of the College, who serves as chairman; Secretary of the Former Students Association; and representatives, appointed by the President, as follows: one from the Counseling and Testing Center and one from each of the undergraduate schools of the College.

In general there are three types of scholarships available: (1) Valedictory Scholarships and Opportunity Awards, representing those limited to entering freshmen; (2) scholarships designed for the more advanced undergraduate students; and (3) fellowships and grants-in-aid for graduate students.

The over-all program is designed to encourage and reward scholastic effort on the part of all students; to enable outstanding students to do the best work of which they are capable by removing financial handicaps; and to enable capable and ambitious young men who might be denied a college education for financial reasons only to secure that education at the Agricultural and Mechanical College of Texas.

## Valedictory Scholarships

The College offers a scholarship to the valedictorian or honor graduate, if a boy, of an accredited secondary school of Texas that holds at least fifteen units accredited by the Texas Education Agency. The successful applicant must make the highest record among all students, boys and girls, graduating that calendar year including winter, spring, and summer graduating classes, and must be certified through the Texas Education Agency. The scholarship is valid during each semester of the first long session after the holder's graduation from high school. The financial benefit is exemption from the tuition fee, the student services fee, and laboratory fees for courses in which the student may enroll. The scholarship is not valid for the second semester unless the student has passed at least ten semester hours for the first semester with an average grade of C or better.

## The Opportunity Award Program

This program annually provides approximately 100 four-year scholarships to high school graduates of Texas who are capable of outstanding scholastic achievement and who need financial assistance to attend college. The awards are made possible through the A. and M. College Development Fund and by interested citizens and organizations of the State. Financial benefits range in value from $800 to $1600 with recipients receiving from $200 to $400 each year for four years plus an opportunity for additional earnings from student employment if necessary. Most of the awards are unrestricted as to course of study or degree objective in college.

Graduates of accredited high schools of Texas who have not attended another college or university, who are legal residents of this state, and who need financial assistance to attend college are eligible to make application for an Opportunity Award Scholarship. To be considered for such a scholarship, an applicant must satisfy the admission requirements of the College; must make formal application for an award on forms provided by the College; and must enter the state-wide competition which is held each spring. Selections are made by the Faculty Scholarships Committee on the basis of the applicant's academic record in high school; his scores on competitive examinations; evidence of initiative, leadership, and other traits of good character; and his need for financial assistance. In order for the award to be continued from semester to semester, the recipient must maintain a standard of scholastic achievement and personal conduct satisfactory to the Scholarships Committee.

This program is usually announced officially between February 20 and March 10 each year. Official announcements and application blanks are distributed over the State between these dates and are also made available to those interested upon request. Requests for additional information and application forms should be addressed to the Secretary, Faculty Committee on Scholarships, Office of the Registrar, A. and M. College of Texas, College Station, Texas.

### Scholarships for Advanced Undergraduate Students

One-year scholarships ranging in value from $100 to $750 are available to outstanding students already enrolled in the College. Some of these are limited to certain fields of study and to individuals who have attained a necessary academic classification, while others are unrestricted in this regard. Recipients are usually chosen by the Faculty Committee on Scholarships in April or May each year with the basis of selection determined by the nature and intent of the award.

Some of these scholarships are given as "rewards for a job well done" and are intended to recognize outstanding scholastic achievement or other meritorious accomplishments. As such, they not only benefit financially the student concerned but also encourage and promote scholastic attainment and leadership on the part of other individuals. In addition to the reward type of scholarship, others are made available to outstanding students who must have financial assistance in order to remain in school or to do a high quality of work while enrolled. It is the general objective of this type of award to encourage every scholar to go as far as his abilities and ambition will carry him.

Information regarding scholarships for advanced undergraduate students may be obtained from the Secretary, Faculty Committee on Scholarships, Office of the Registrar.

# STUDENT LIFE

## LEADERSHIP AND GUIDANCE

Leadership and guidance in the area of student life are the responsibilities of the Dean of Students. Responsibility for the enforcement of College regulations lies with the Director of Student Affairs for civilian students and with the Commandant of Cadets for military students. Appeals by civilians may be made to the Director of Student Affairs and by military students to the Commandant.

The student government of the College is carried out through the Student Senate. The office of the advisor of the Student Senate and the files for the organization are in the Directorate Office, west end, ground floor of the Memorial Student Center.

The Civilian Council serves as the official governing body for civilian students, with responsibility in those areas affecting civilian students only. The Council is advised by the Department of Student Affairs.

## BASIC POLICY

The rules of conduct by which every student is expected to live while attending the A. and M. College of Texas are contained in the Basic Policy, a copy of which follows:

The Board of Directors finds it necessary to assert the basic principles to govern student life and staff-student relationship at the A. and M. College of Texas.

The College accepts responsibility for the curricular work of the student and for his conduct and development. The term "College" as used here embraces the Board of Directors, the President, the faculty, all personnel of the A. and M. system, the student body, former students, and all the worthy traditions of the institution.

Every student is expected at all times to recognize constituted authority, to conform to the ordinary rules of good conduct, to be truthful, to respect the rights of others, to protect private and public property, and to make the best use of his time toward an education.

Every student has rights which are to be respected. They include the right of respect for personal feelings, the right of freedom from indignity of any type, the right of freedom from control by any person except as may be in accord with published rules and regulations of the College, and the right to make the best use of his time and his talents toward the objective which brought him to this institution. No officer or student, regardless of position or rank, shall violate those rights. No custom or regulation in conflict will be allowed to prevail.

It shall be the duty of every person employed by this institution to conform to this policy; to cooperate with all agencies of the College and with the student body, individually and collectively, in carrying out its provisions. Personal responsibility in this respect will be primary.

## THE OFFICE OF THE DEAN OF STUDENTS

Responsibility for the development and welfare of the student in areas other than academic is placed with the Office of the Dean of Students. Activities are provided which help to meet the physical, emotional, social, and spiritual needs of students.

Student personnel departments and offices under the direction of the Dean of Students include the following:

Commandant (Headquarters of the Corps of Cadets)
Army ROTC

Air Force ROTC

Student Affairs, Veterans, Advisory Service, Foreign Student Advisor, Campus Security, Housing and Civilian Counselors

Memorial Student Center

Placement of Graduates, Student Labor and Loan, Short Courses

Student Health Services and Campus Hospital

Y.M.C.A. and the All Faiths Chapel

## STUDENT AFFAIRS

The Department of Student Affairs includes the activities and functions of the Veterans Advisors Office, the Housing Office, Civilian Dormitory Counselors, the Foreign Student Advisor's Office, and the Campus Security Office.

## VETERANS ADVISORY SERVICE

The A. and M. College of Texas provides a Veterans Advisor to assist ex-servicemen with their problems. This office is located on the ground floor of the YMCA Building.

## HOUSING AND MEALS

**Single Students:** Unless they are living with their families, all students are required to live in College-owned dormitories on the campus. Dormitories are designed especially to meet the student's needs of living and study.

Reservations are filed in the order in which they are received and will be held only until 3 p.m. of the regular registration day. Reservations made by students who do not complete their registration on the regular registration day by 5 p.m. may be cancelled, and the space will be assigned to another applicant.

New students may file room reservations as soon as they have been accepted by the Director of Admissions and Registrar. As soon as a new student has been accepted for admission, he will be mailed a room reservation request card, which should be filled out as directed and returned to the Fiscal Office with a check or money order for $6.00 for room reservation fee and key deposit. As soon as the reservation has been made, the student will be notified of his assignment to dormitory space. The room reservation fee will be credited to the student as part of his room rent payment upon his registration in June, September, or February. Should a student decide that it will be impossible for him to register, he may have his reservation cancelled, provided he notifies the Housing Office prior to the regular registration day of the semester for which the reservation has been made. In such cases the room reservation fee may be returned. Cancellations made after the regular registration day indicated above will result in a forfeit of the reservation fee. The room assignment card and room reservation fee receipt will be secured at the Housing Office, Ground Floor, YMCA Building, when the student reports for registration.

All cadets residing on the campus are required to take their meals in one of the two dining halls on the campus, operated by the Subsistence Department of the Business Office. Each has a seating capacity of 4,000 and furnishes the students at cost well-balanced meals prepared under the direction of experienced supervisors.

Those students who are not members of the Cadet Corps may also eat their meals in the College dining hall. They, however, may take their meals elsewhere if they so desire.

**Married Students:** The College has ample apartments for married students, consisting of 351 furnished two-bedroom apartments, 312 furnished one-bedroom apartments, and 115 unfurnished two-bedroom apartments. More complete information and application forms may be obtained from the Housing Office, Ground Floor, Y.M.C.A. Building.

## FOREIGN STUDENT ADVISOR

The Office of the Foreign Student Advisor is located in Room 27, Milner Hall. Information relative to immigration regulations and assistance with problems peculiar to students from other lands may be obtained from this staff member.

## REGISTRATION OF MOTOR VEHICLES

All students and employees who drive motor vehicles on the campus must have them registered in the Office of Campus Security, Ground Floor, YMCA Building, within 48 hours of the time that they are brought on the campus.

Students are assigned parking areas according to their housing assignment. Cars must be parked in these designated areas during the regular classroom hours.

## MEMORIAL STUDENT CENTER STUDENT ACTIVITIES

Dedicated to the memory of the men of the Agricultural and Mechanical College of Texas who gave their lives during World Wars I and II, the Memorial Student Center was erected to foster the social, cultural, and spiritual phases of student life.

General facilities of the Memorial Student Center include a dining room, cafeteria, snack bar, gift shop, telephone and telegraph center, barber shop, 66 guest rooms, travel agency, check cashing and information center, and United States Post Office. Recreational facilities include bowling alleys, table tennis area, game room, browsing library, and record playing rooms. A large number of meetings, receptions, exhibits and social affairs given by the student and staff organizations of the College are held at the Center.

Included in a special activities program of the Memorial Student Center Directorate are the following special interest committees: Creative Arts, Music, Dance, Radio, Camera, Browsing Library, Film Society, Recital Series, Great Issues, Flying Kadets, Bowling, Table Tennis, Chess, Public Relations, Personnel, Evaluation, and the Student Conference on National Affairs. These activities are governed by the Memorial Student Center Council, composed of nine students, five faculty members and two former students, with a student as president of the Council. The Directorate, which is composed of the various committees, plans and directs the entire program. Many positions of leadership are open in this student program for those who join the committee activities at an early date.

The Memorial Student Center is charged with counseling and fiscal operation of many student activities. It sponsors such activities as recreation and entertainment on the campus, including the campus movie program, music and drama activities, social activities, clubs, student government, and other co-curricular activities.

The Memorial Student Center Building Cashier provides banking service for the numerous student organizations on the campus and in the Memorial Student Center. The Cashier's window is also headquarters for the sale of season and individual tickets for various campus presentations, including Great Issues and Town Hall.

**Clubs:** Many opportunities exist for students interested in co-curricular club activities. There are more than 150 organizations on the campus, ranging in interest from hometown clubs to technical societies. Their activities include discussion meetings, movies, smokers, barbecues, dances, and inspection trips.

**Dances and Social Affairs:** Social life at the Agricultural and Mechanical College of Texas is highlighted by numerous dances and social functions. The various classes, military units, and civilian organizations sponsor dances. In addition, certain all-school social functions are held for which outstanding name bands provide music. The most elaborate function is the traditional Senior Ring Dance and Banquet, when graduating seniors and their guests dance to an outstanding orchestra of the year. All parties and other social functions, whether held on or off the campus, must be approved by the College.

**Town Hall:** The Town Hall program includes the best obtainable artists in the fields of music and entertainment. Since its inception, the Town Hall roster has boasted such names as Bob Hope, Doris Day, Oscar Levant, Marge and Gower Champion, the Ballet Russe de Monte Carlo, the Four Freshmen, the Kingston Trio, the Houston Symphony, the Boston Pops Orchestra, several Broadway musicals, and many other famous entertainment features. Activity fees and the sale of season and individual tickets make it possible to bring these outstanding programs to the student body at low prices.

**The Aggie Players:** This is a student organization that offers active participation in theater work for college credit or as extracurricular activity. It is part of the Memorial Student Center program and presents three to five major dramatic productions a year. Any student is invited to join.

**Debate Activities:** The Aggie Discussion and Debate Club is sponsored jointly by Student Activities and the Department of English. Activities include the annual A. and M. debate tournament, six other tournaments, poetry reading, extemporaneous speaking, and oratory. Interested students should come to the Department of English.

**Singing Cadets:** This widely known singing unit consists of more than 60 students. The group has appeared in many Texas cities and in Mexico, on numerous broadcasts and telecasts, and on various other entertainment programs. Membership is selected from the entire student body by auditions held early in the fall semester.

**Aggieland Orchestra:** The Aggieland Orchestra is a College-sponsored dance band. Each year the organization plays for numerous dances and shows on the campus. Tours are taken to different parts of the state to play for A. and M. Club dances. Members are chosen in the fall of the year. Rehearsals are held each week in the Music Hall.

**Music Hall:** For students interested in music, a building with practice rooms and pianos is provided. The Music Hall also contains a library of vocal, piano, and other instrumental literature which can be checked out by students. It is open for use from 8 a.m. until 5 p.m., but may be used by special permission at night for instrumental or vocal groups.

**Guion Hall Theater:** The Guion Hall Theater is operated on weekends to provide economical and convenient movie entertainment for the student body and College staff. Although good pictures are shown, they are usually second-run shows in order to keep costs as low as possible. Continuous evening filmings are shown while school is in session.

**The Grove:** The Grove is an outdoor concrete recreational area with a stage, utilized by the Memorial Student Center for the scheduling of movies, intramural athletics, concerts, dances, picnics, games, and festivals. In the fall the Grove is the scene of the famous Texas Aggie yell practices.

## COLLEGE HEALTH SERVICES

The College Hospital has been remodeled recently to give more efficient service. Besides infirmary space for over 100 patients, the facilities now include a complete physiotherapy department as well as new laboratory and x-ray departments. The medical staff includes specialists in the field of medicine, surgery, radiology, and ear, nose, and throat.

The Clinic is open from 8 a.m. to 5 p.m. on weekdays and from 8 a.m. to 12 noon on Saturdays. The Student Services fee provides for clinic visits, diagnostic examinations, care for acute illness, emergency care for accidents, and 10 days of infirmary care each semester in cases requiring hospitalization. Routine medications for acute illnesses, x-rays, laboratory tests, and local ambulance service are also furnished the student without charge. A staff of Registered Nurses is on duty, with a staff physician on call, to care for emergency cases at any hour.

The water of the College is supplied through a College-owned water supply system and comes from four deep wells located nine miles northwest of the College campus. As a part of the sanitary work carried on throughout the entire year, the College laboratories make bacteriological checks of this water supply and of the milk supply at regular intervals.

The College is particularly concerned with the maintenance of the health and physical development of its students. It provides one of the finest indoor swimming pools in the State, as well as tennis courts, a golf course, athletic fields, and physical training.

## RELIGIOUS ACTIVITIES

The A. and M. College of Texas is non-sectarian, but its high objectives cannot be achieved unless its educational program is founded on a solid religious life. Divorced from the spiritual aspirations of the individual and of the group, education cannot be complete. The basic purpose of education is a normal religious life to the end that young people may be not only more efficient but better motivated by a sense of duty and obligation. Thus, in an atmosphere of tolerance and mutual respect, every student is encouraged to maintain his ties with the religious group to which such association may be made most fruitful.

**Young Men's Christian Association:** The YMCA endeavors to develop the full, rounded man by emphasizing growth in mind, body, and spirit. Because of the effect of the YMCA on the lives of many students, it holds a coveted spot in the hearts of Aggies.

The varied and vigorous program of the YMCA depends on student participation, initiative, and leadership. The program is centered around stimulating the moral and spiritual lives of the students and includes religious discussions, Bible study, conferences, intercollegiate visits, steak fries, leadership development, Freshman Camp, Religious Emphasis Week, United Nations Club, Preparation for Successful Marriage Forums, and many other worthwhile projects.

**All Faiths Chapel:** The beautiful new All Faiths Chapel, a gift of the Former Students, is made of Austin limestone and glass, and is modern in design.

In addition to encouraging individual meditation and prayer and serving as a meeting place for small religious groups, the other activities foreseen include making available a library of religious books, a secluded meditation room, accommodations for small weddings, funerals, memorial services, baptisms, vesper services, and other religious rites. The Chapel is open at all hours for meditation and prayer.

**Religious Services:** In addition to the college religious life staff, there are nine churches near the campus whose primary purpose is to serve the spiritual needs of the students. The campus religious leadership is deeply conscious that the students are in perhaps the most formative period of their lives and feel keenly the responsibility for their spiritual development.

The programs of the respective churches are aimed primarily to meet the student needs. Many of the churches have distinct student departments with specialized leadership whose sole responsibility is that of ministering to the students. The pastors of the churches also give as much time as is necessary to the students for personal counseling.

The churches serving the campus have a program similar to that of the home church with an expanded young people's department and dominant emphasis upon student interests. In addition to the special student emphasis, they have the customary Sunday worship periods, church schools, and young people's organizations promoted to stimulate clear and constructive thinking in the important field of religion. The student departments are expanded to offer wholesome recreation and social life and social service.

**Religious Emphasis Week:** One week during each year is designated officially by the College administration as Religious Emphasis Week, in which the entire College cooperates, making it possible to have an outstanding religious leader to address voluntary convocations of the students. The administration of the College, knowing the value of developing the spiritual aspects of the personality of the student, authorizes an adjustment of the College program so as to permit all students to attend.

**Courses in Religious Education:** The Baptist General Convention of Texas; the Church of Christ; the Board of Missions of the Episcopal Church, Diocese of Texas; the B'nai B'rith Hillel Foundation; the Division of College and University Work, National Lutheran Council; the Texas Methodist Student Movement; the Presbyterian Church, U.S. and U.S.A.; and the Roman Catholic Church, Diocese of Austin, upon approval of their respective boards, have been authorized to offer courses in religious education open to students of junior and senior classification.

A maximum of six semester hours from the following courses in religious education may be applied toward a degree from the College.

**305. Old Testament Character Studies. (1-0). Credit 1.**
Through a chronological study of many characters in the Old Testament, the student becomes acquainted with experiences in the lives of these characters, through which is revealed the righteous and omnipotent God of the Old Testament.

**306. New Testament Character Studies. (1-0). Credit 1.**
After a brief introduction to the New Testament giving the political, social, moral and religious situation at the time of Jesus' birth, the course will pursue a character study of key personalities in the New Testament and their contribution to the Christian system of thought.

**309. Early Old Testament History. (1-0). Credit 1.**
Story of Bible history as recorded in first five books; study divided into five periods between the Creation and the Wilderness wanderings.

**310. Later Old Testament History. (2-0). Credit 2.**
Periods of Bible history studied include: conquest of Canaan, the Judges, the united Kingdom, the divided Kingdom, Judah alone, the exile, and return from exile.

**311. The Synoptic Gospels. (2-0). Credit 2.**
A study of the first three Gospels, Matthew, Mark and Luke, with emphasis upon the contribution of each to our knowledge of the life and teachings of Jesus.

**312. The Gospel of John. (1-0). Credit 1.**
This course is a detailed study of the life and teachings of Jesus as reported in the fourth Gospel. Special attention is given to interpretation of Jewish customs and institutions for the non-Jewish (Greek) readers.

**313. Survey of the New Testament. (2-0). Credit 2.**
Each book of the New Testament is studied with reference to its author, purpose, content, unique characteristics, and the historical background which provided the occasion for its writing.

**314. Survey of the Old Testament. (3-0). Credit 3.**
Each book of the Old Testament is studied in light of the historical background of the Hebrew people and the development of their relationship with God.

**318. The Book of Acts. (1-0). Credit 1.**
Chapter by chapter study of Acts; founding and spread of church in Jerusalem, Judea, Samaria; Paul's travels; church among the Gentiles.

**319. The Epistles of Paul. (2-0). Credit 2.**

A study of the life and thought of Paul as found in the Book of Acts and Pauline correspondence. A history of the primitive church as reflected in these writings.

**320. The Book of Revelation. (1-0). Credit 1.**

This book is studied in the light of the persecution of Christians in the Roman Empire, and as an apocalyptic writing to serve in strengthening their faith in and loyalty to Christ and to his teaching.

**321. The General Epistles. (1-0). Credit 1.**

A study of the "open letters" written by James, John, Peter, and Jude to the early Christian churches, comparing their messages with the recorded words of Jesus relative to the situation and problems of their day and ours.

**323. The Life of Jesus. (3-0). Credit 3.**

In this course, the four Gospels are studied with the passages in the four books arranged in chronological sequence so as to give a connected account of the life of Christ and to reveal similarities and differences in the four books.

**324. The Prophetic Movement in the Old Testament. (3-0). Credit 3.**

A history of the prophetic movement from the 8th century B.C. to the time of the Maccabees. An interesting study of the contribution of the prophets to the religious thinking of the day, and the permanent value of their teachings.

**325. The Book of Job. (2-0). Credit 2.**

The book of Job is one of the great books of all time. It offers in interesting form a thorough study of the problem of suffering.

**326. The Psalms. (2-0). Credit 2.**

This study of the book of Psalms includes a glance at Hebrew poetry, at the source and background of certain of the Psalms, and a study of their beauty of structure and composition and of their interpretation.

**327. An Introduction to the Bible. (2-0). Credit 2.**

A course to acquaint the student with the Bible showing its unity and the continuity existing between the Old and New Testaments by a study of representative sections of both Testaments together with their historical settings and their relationship to each other.

**329. Proverbs. (1-0). Credit 1.**

This study of the book of Proverbs includes authorship, date of writing, and a close study of the practical wisdom contained in the proverbs, of which the book is full.

**330. Ecclesiastes and the Song of Solomon. (1-0). Credit 1.**

A study of two neglected books of the Bible—their contents, interpretation, and significance.

**335. Comparative Religions. (2-0). Credit 2.**

A study of the most popular contemporary religions of the world as channels through which men have tried to find the meaning of life and to relate themselves to its values. It includes Buddhism, Confucianism, Mohammedanism, Judaism, and Christianity.

## CORPS ACTIVITIES

The aim of the Corps of Cadets is to offer a sound collegiate education in both mind and body under strictly military discipline. The method of administration of this military discipline and its extension to all phases of the cadet's non-academic life are distinctive at the Agricultural and Mechanical College of Texas. Students are organized along military lines and observe military practices at all times. They habitually wear the prescribed uniform and live in rooms assigned to them on the basis of their military organization. From reveille to taps, every hour of the cadet's time is accounted for. The regular habits of study and living thus formed, the attention to duty, obedience to authority, and love for order inculcated are considered among the most valuable features of the military education. While some of the graduates enter the military profession, hundreds in all walks of civil life attest to the high value of the training received at this institution.

An integral part of the military system is the requirement of freshmen of certain extra duties and activities at the beginning of their college career. During the early weeks of their first year the cadets have special drills under their cadet officers and follow a rigorous program of behavior designed to improve their military posture and to inculcate early respect for upperclassmen who are their military superiors. These special activities do not interfere unduly with the freshman's academic program nor usurp his prerogatives as a private individual. They are supervised by responsible cadet officers under the general supervision of the Commandant and are to be distinguished from irresponsible hazing which is forbidden by the rules and regulations of the College.

In keeping with the democratic ideals of the Agricultural and Mechanical College of Texas, the formation of exclusive societies or fraternities, membership in which is based on other requirements than individual worth and achievement, is forbidden. When new cadets report to the college, all are at once put in uniform and, as far as possible, all artificial distinctions based on wealth, position, or influence are minimized and the cadet is encouraged to achieve his place by individual merit. All cadets live under practically identical conditions, and all are rated by the same standards, but there is a wide range of opportunity for each to develop in accordance with his needs and aptitudes.

Among Cadet Corps organizations is the Ross Volunteer Company, a military group composed of outstanding cadets. This unit was organized in 1887 by Colonel T. M. Scott, business manager of the College, for the purpose of banding together the most proficient military men in A. and M. College into a precision drill team. They were first called the Scott Volunteers. The name was changed to Ross Volunteers in 1891 to honor Governor Lawrence Sullivan Ross, who in that year became President of the College. It was originally the plan of the organization to change its name in honor of each succeeding president of the College, but in 1902, at President Harrington's request, the idea was dropped and the name Ross Volunteers made permanent.

There are several important cadet organizations that do not come under a specific classification. The following should be mentioned as having distinctive functions in cadet life: the Aggie Band, the largest college military band in the United States; the Rifle and Pistol Teams, which compete in national matches; and the Freshman Drill Team, a precision military drill team.

## STUDENT PUBLICATIONS

The College provides unusual opportunity for students to participate in student publications. An Office of Student Publications, headed by the Director, works within the framework of policy established by the Board of Student Publications.

The Office of Student Publications, together with editorial offices, is located on the Ground Floor of the YMCA Building.

The following seven publications are issued:

**The Battalion:** The Battalion is the student newspaper edited and produced by Texas A. and M. students. It is also the official newspaper of the City of College Station. Students who begin work as freshmen or sophomores may become paid employees in editorial capacities during their junior and senior years.

**The Aggieland:** The yearbook of the student body is known as **The Aggieland.** Many opportunities for participation are available because of the amount of work necessary to produce a complete record of the school year.

**Student Directory:** Each year the Office of Student Publications publishes an official directory of offices, staff personnel, and students for the College.

**The Engineer:** Published six times annually by students in the School of Engineering, this journal is designed to inform and to promote talent for technical writing. Students who have ability in research, in reporting scientific data, or in creative writing, are welcome as members of the staff.

**The Agriculturist:** Students of the School of Agriculture produce **The Agriculturist,** a quarterly publication printing research, scientific and technical articles relating to the field of agriculture.

**The Southwestern Veterinarian:** The leading college veterinary magazine in the country, as well as in foreign countries, this publication is produced quarterly by the students of the School of Veterinary Medicine.

**The Texas A. and M. Review:** Students of the School of Arts and Sciences publish The Texas A. and M. Review, a campus-wide magazine of general interest, four times each year.

## THE TEXAS AGGIE BAND

The Texas Aggie Band is the official band of the A. and M. College. It is often referred to as the "pulse of the Spirit of Aggieland" and furnishes music for military ceremonies, yell practices, and athletic events.

Interested new students should indicate on the advanced room reservation card their desire to participate. No try-outs are necessary. Although a large number of College-owned and government-owned instruments are available for issue, it is advised that students having their own instruments bring them.

## INTRAMURAL ATHLETICS

Intramural athletics feature contests between military units and between civilian organizations. The intramural program, which is one of the most outstanding in the country, includes flag football, softball, volleyball, handball, basketball, track, swimming and diving, wrestling, bowling, horseshoes, rifle shooting, golf, cross country, tennis, and table tennis. Ample physical facilities are available to accommodate these comprehensive intramural activities.

## INTERCOLLEGIATE ATHLETICS

The A. and M. College of Texas is a member of the Southwest Athletic Conference, which embraces eight leading major colleges and universities—The University of Texas, the Agricultural and Mechanical College of Texas, Baylor University, Rice University, Texas Christian University, Southern Methodist University, the University of Arkansas, and Texas Technological College. The intercollegiate program includes football, baseball, basketball, track, cross country, swimming, tennis, and golf. Varsity teams in each sport are known as the Texas Aggies, and the uniforms used by the players are in the school's colors, maroon and white.

Center of athletics is Kyle Field, which contains the football stadium seating 33,000 in the old stands, 2,460 in the new addition to the west stands, and with temporary bleachers and cinder path boxes giving a total capacity of 41,594. A quarter-mile cinder track with a 220-yard straight-away and a baseball diamond with 4,000 seats afford excellent facilities for these sports. The P. L. Downs, Jr., Natatorium with swimming pool 100 by 60 feet, has lockers and showers, and seats for 600 spectators. DeWare Field House has been converted from a 3,500-seat basketball gymnasium into a Physical Education Plant, while the new G. Rollie White Coliseum seating 8,500 is available for basketball and other indoor College events. In addition there is an auxiliary gymnasium with handball courts and large rooms for physical education classes. An 18-hole golf course is available to students on the campus.

## OFFICE OF PLACEMENT AND SPECIAL SERVICES

### Employment for Graduates

The College feels a definite responsibility for the proper professional placement of its graduates. Assistance in fulfilling this responsibility is shared jointly by the faculty and the Office of Placement and Special Services. The function of this office is to maintain active contact with prospective employers of the graduating students and alumni in such manner that well qualified men may be directed to suitable job opportunities.

Supplementing assistance in securing professional employment, this office cooperates with other College departments in an educational program designed to acquaint undergraduates with opportunities in the fields of work in which they are interested, and to advise on problems which will be met in entering professional employment. Assistance is given students in preparing credentials for submission to employers as well as advice on the proper approach in seeking a job. Assistance is also given undergraduates in securing employment during the summer vacation.

Seniors and graduate students who wish to make use of these services are requested to file a record of their qualifications with the Placement and Special Services Office early in the year in which their college work will be completed. There is no charge for this service other than for personal leaflets, which are prepared at cost on request.

### Employment for Students

Part-time employment of resident students is coordinated by the Office of Student Labor and Loans, a part of the services of the Office of Placement and Special Services. Every effort is made to develop new employment opportunities outside of the College. To become eligible for employment, a student must have been admitted to the College by the Director of Admissions and have an accepted application on file with the Office of Student Labor and Loans. Continued eligibility for employment is contingent on satisfactory performance of work and on the ability of the student to maintain good scholastic standing.

Ordinarily only those students whose financial resources are limited may be considered for employment. Assignments are made primarily on the basis of need and sincerity of purpose.

### Loan Funds

The Association of Former Students administers a series of loan funds which are available to any student who has been in the College at least three semesters, and whose record in conduct and scholarship is satisfactory. The amount of the loan in each case depends on the student's actual needs.

Various other loan funds are available. Information about such may be secured from the Head of the Office of Student Labor and Loans. Included in such funds are the Lucy Jane Breazeale Loan Fund, the Ernestine Gaber Loan Fund, the Davis Buck Fund, the Allsup-Ramsey Loan Fund, the George Long Memorial Fund, the James Leftwich Shepherd Fund, the Sonora A. and M. Mothers' Club Fund, the A. and M. College Loan Fund, and the Jitterbug Henderson Memorial Loan Fund. Students desiring National Defense Student Loans should apply at this office.

### Special Services

Special services of the Office of Placement and Special Services include the administration of the Short Courses program.

# ACADEMIC REGULATIONS

Certain academic regulations have been set up by the faculty for the purpose of assisting the student to secure the maximum benefit from his studies. These regulations, contained in the copy of **College Regulations** given to each student when he enters the College, serve as a guide in such important matters as choice of course and subjects, methods of study, attendance, examinations, promotion, and graduation.

By means of reports at regular intervals, frequent conferences with the deans, the Registrar, Office of the Dean of Students, and members of the teaching staff, the authorities of the College keep in close touch with the student's progress; and such advice and counsel are offered from time to time as seem justified in each case. For failure to keep up with his studies, the student may at any time be dropped from the rolls of the College.

The College reserves the right to modify the curricula or withdraw any course when it appears wise to do so.

## DEGREES OFFERED

The following degrees are offered for the satisfactory completion of resident study in the appropriate curriculum:

Bachelor of Arts (B.A.)
Bachelor of Business Administration (B.B.A.)
Bachelor of Science (B.S.)
Bachelor of Architecture (B.Arch.)
Bachelor of Petroleum Engineering (B.P.E.)
Doctor of Veterinary Medicine (D.V.M.)
Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Philosophy (Ph.D.)

On the basis of acceptable professional experience the following professional degrees in engineering are offered to graduates of the College:

Aeronautical Engineering (Aero.E.)
Agricultural Engineer (A.E.)
Architectural Engineer (Arch.E.)
Chemical Engineer (Ch.E.)
Civil Engineer (C.E.)
Electrical Engineer (E.E.)
Geological Engineer (Geol.E.)
Industrial Engineer (Ind.E.)
Mechanical Engineer (M.E.)
Petroleum Engineer (P.E.)

## REQUIREMENTS FOR A BACCALAUREATE DEGREE

The diploma of the College, with the appropriate degree, will be granted to the student who has made formal application for the undergraduate degree and has satisfied the following requirements:

1. He must complete one of the regular courses of study leading to a degree.

2. The total number of grade points earned at this institution in courses applied to this degree must equal at least the number of hours which he carried in courses at this institution which are applied to this degree. Grades of F or WF shall be included, except such grades and grades of D made in the freshman year or summer session preceding that year which are subsequently repeated satisfactorily during the student's first four semesters in college. Grades of WP shall be excluded.

3. The total number of grade points earned at this institution in courses in his major department applicable to this degree must equal at least the number of hours which he carried at this institution in his major department which are applied to this degree. Grades of F and WF shall be included, but grades of WP shall be excluded.

4. Grades made in courses elected in excess of a student's degree requirements shall be counted, but if failed such courses need not be repeated.

5. He must have settled all financial obligations to the College.

6. He must be formally recommended for graduation by the Academic Council after consideration of his complete record.

7. Unless registered in absentia or excused by his dean, he must be present in person at the graduation exercises.

These requirements must be completed and all grades on record in the Registrar's Office not later than 5 p.m. on Thursday preceding Commencement Day.

Requirements for an advanced degree are outlined in the Graduate Bulletin.

## APPLICATION FOR A DEGREE

During the semester or summer session preceding the conferring of the degree, a student must be officially registered in the College. Formal application for degrees must be submitted to the Registrar, on forms provided for that purpose, not later than 90 days prior to the end of the semester, or 30 days prior to the end of the summer term, in which the student expects to complete his requirements for graduation.

In order to be a candidate for a degree at the end of a semester or summer term, a student at the beginning of that semester or term must fulfill the following two conditions:

1. He must be registered for the courses necessary to complete the requirements of his curriculum.

2. For work of his final semester or summer term, he must not lack a grade point ratio in excess of 1.50 in his major field and for his over-all program of studies in order to meet the grade point requirement for graduation.

## RESIDENCE REQUIREMENT

A candidate for a Bachelor's degree must complete the requirements of the final year's work of his curriculum in residence at this institution with the exception of six semester hours, which may be accepted in transfer. However, in every case the student must complete at least 36 semester hours of the last two years of his curriculum at this institution.

A candidate for a Bachelor's degree in the School of Agriculture will be expected to complete approximately the last two years in residence at this institution. Acceptance of transfer credit for courses in agriculture generally will be limited to those courses taught in the freshman and sophomore years at this institution.

## TWO DEGREES

A candidate for a second Bachelor's degree must have been in residence at least two academic years and must have completed all the essential work of the second curriculum not covered in the first; in all such cases the total amount required must be at least 30 semester hours additional to the greater number required for either degree.

## CHANGE OF CURRICULUM

Applications for change of curriculum shall be passed upon by the deans of the schools and heads of divisions concerned. A student under 21 years of age must have the written consent of his parent or guardian.

At the time of the change, the dean of the school or head of the division to which the transfer is being made will indicate any courses on the student's record which are to be excluded from requirements for his new curriculum and will so advise the Registrar.

## CREDIT BY EXAMINATION

College credit may be given for satisfactory scores on the College Board Advanced Placement Examinations in the following subjects:

**American History**
**Biology**
**Chemistry**
**English Composition**
**French**
**German**
**Mathematics**
**Spanish**

The College offers its own series of advanced placement examinations. These may be taken instead of the College Board Advanced Placement Examinations to obtain college credit. There is no charge for taking these examinations. The Agricultural and Mechanical College of Texas offers credit by examination in the following courses:

**Biology** 101, 107, 115
**Chemistry** 101, 102
**English** 103, 104
**History** 105, 106
**Mathematics** 102, 103
**Modern Language** 101, 102, 103, 104, 105, 106, 109, 110

The Director of Admissions and Registrar will furnish all necessary information to anyone interested in obtaining credit by means of these examinations.

## TRANSFER OF CREDITS

As a general policy credit will be given in transfer for work completed with a grade of C or better at another properly accredited institution. Work completed with the grade of D must be validated before it can be transferred. Validation may be by examination or by completion with a grade of C or better of more advanced work in the same subject area. Any student desiring to validate work done elsewhere should discuss with the Registrar the conditions necessary for validation of his particular work and secure from him authorization for such action. Credits given by transfer are provisional and may be cancelled at any time if the student's work in the College is unsatisfactory.

Work done in an institution not properly accredited must be validated by one of the two methods of validation already mentioned before it can be transferred.

## CORRESPONDENCE COURSES

The Agricultural and Mechanical College of Texas offers no correspondence courses. A student in residence at this institution will be permitted to receive undergraduate credit for correspondence courses taken elsewhere only when written permission has been granted in advance by the dean of his school.

Credit earned in a course completed by correspondence will be accepted only after a validating examination has been passed unless the final examination is taken under the supervision of the Registrar at this college. An exception will be made in the case of courses taken through the United States Armed Forces Institute.

Not more than twelve semester hours of credit taken in correspondence work may be applied toward the requirements for a degree.

## REQUIREMENT IN GOVERNMENT AND HISTORY

In order to meet the legal requirements for a baccalaureate degree, all students must have credit for six semester hours of American history or three semester hours of American history and three semester hours of Texas history, in addition to the long-standing government requirement of Government 306 and credit for three semester hours of military or air science. For those students who do not take military or air science, six hours of government must be completed. Such students must complete Government 306 and 307.

In satisfying the government requirement for a teacher's certificate, Government 306 and 307 may be used. Government 305 will fulfill this requirement. Credit for basic military science cannot be used in satisfying this requirement.

## REQUIREMENT IN PHYSICAL EDUCATION

All students under 21 years of age at the time of entrance are required to complete Physical Education 101, 102, 201, 202.

Transfer students will be given exemption from one semester of required physical education for each semester of course work completed at the other institution.

Students who have completed as much as one year of service in the Armed Forces of the United States on active duty will be exempt from the requirement in physical education.

## REQUIREMENT IN MILITARY TRAINING

Any student entering with freshman classification (less than 30 semester hours of credit) who is a citizen of the United States, physically qualified, under 21 years of age, and who has had no previous service with the Armed Forces must successfully complete two years of military training.

Enrollment in air science or military science is synonymous with enrollment in the Corps of Cadets and is a part of military training as offered at this college. The Corps is organized into military units which are constantly under military discipline and supervision; likewise, the members of the Corps are required at all times to wear the appropriate uniform.

Members of the Corps of Cadets who are housed in military units will, upon the completion of the basic course, make application for advanced course contract, and, if qualified, be enrolled in advanced course ROTC. Students are reminded that acceptance of an advanced course ROTC contract requires completion of the advanced course ROTC curriculum, completion of the ROTC summer camp, and acceptance of a reserve commission if one is tendered. The foregoing become integral parts of the degree requirements of advanced course ROTC students. Therefore, for those students under an advanced course ROTC contract the College will not grant a degree prior to acceptance of a reserve commission. Likewise, the reserve commission will be withheld from advanced course ROTC students who have completed requirements for a reserve commission until they have completed work for their academic degree.

## ELIGIBILITY FOR AN ADVANCED ROTC CONTRACT

To be considered for an advanced course ROTC contract a student must: (1) be morally and physically qualified, (2) attain junior classification with a minimum grade point ratio of 1.00, (3) have satisfactorily completed the ROTC basic course or have served at least one year of active military service, (4) attain a passing score on the ROTC qualifying examination.

Where the number of contracts to be awarded is for any reason limited, those candidates with the highest qualifications will receive contracts for advanced training.

## ACADEMIC CREDIT IN MILITARY TRAINING FOR EX-SERVICEMEN

Students who have completed one year of service in the Armed Forces of the United States on active duty are exempt from further military training and may be given academic credit of four semester hours for basic ROTC.

Students who have completed six months (under RFA 1955) but less than one year of active duty in the Armed Forces of the United States will be given academic credit for the first year of Army ROTC, but will be required to live in the Corps of Cadets. Such students may be given academic credit for two semester hours of Army basic ROTC. (Credit for six months' training does not apply to the Air Force ROTC.)

Students who have served for at least one year in the Armed Forces of the United States on active duty and who hold a commission are exempt from further military training and may be given academic credit of sixteen semester hours for basic and advanced ROTC.

A student wishing to receive such credit should file a photostatic or certified copy of his discharge with the Registrar's Office so that appropriate credit may be allowed.

## ENGLISH CONFERENCES

Students enrolled in courses in English composition are required to attend conferences with their instructors.

## ASSEMBLIES

In most of the teaching divisions of the College, students are required to attend assemblies at intervals during the session. Prominent speakers are presented at the assemblies for the discussion of topics of general and special interest.

# THE GRADING SYSTEM

Since one comes to college for an education, his grades are usually taken as an indication of the proficiency of his endeavors. The student's semester grade in a course is based upon recitation, written exercises and tests, laboratory work, and the final examination. The final examination has a weight of one-fourth of the final grade, and the proportionate weight assigned to each of the other factors is determined by the head of the department administering the course.

There are four passing grades signifying various degrees of achievement, and grade points are awarded on the basis of these grades.

| Grade | Description | Range (Inclusive) | Grade Points per Semester Hour |
|---|---|---|---|
| A | Excellent | 92-100 | 3 |
| B | Good | 84- 91 | 2 |
| C | Fair | 76- 83 | 1 |
| D | Passing | 70- 75 | 0 |

The lowest passing grade is 70. There is one failing grade, F, below 70, indicating work of unsatisfactory quality. Credit for a course failed may be obtained only by satisfactorily repeating the course in class, except that in a course including both theory and practice, the head of a department may excuse a student from repeating the practice if his grade in the practice is B or better, and if in the judgment of the head of the department the repetition is not necessary. The student must register for both theory and practice, however.

The temporary grade "Inc." (Incomplete) indicates that the student has satisfactorily completed the course with the exception of a major quiz, final examination, or other work. This grade is given only when the deficiency is due to authorized absence or other cause beyond the control of the student and when the work already done has been of a quality acceptable for the satisfactory completion of the course. The privilege of completing such work is limited to the end of the first month of his succeeding semester in college; otherwise the student must repeat the course in order to receive credit, unless for good reason his dean grants an extension of time.

Permission to remove a semester grade of "Inc." received because of absence from a quiz or examination may be granted by the head of the department only on receipt of official notice that the absence was authorized or evidence that the cause for the absence prevented making normal preparation to take the quiz or examination before the close of the semester.

When a student resigns or is dropped from the College after the first two weeks of a semester, the Registrar calls for his grades and enters on his permanent record the symbol WP after each course in which he is passing and WF after each course in which he is not making a passing grade. All WF's and F's will be taken into account in determining his grade point ratio thereafter unless for cause the Executive Committee directs otherwise.

The semester grade in a subject which a student is required to drop on account of failure to keep up with the work is F.

## REPETITION OF A COURSE TO IMPROVE GRADE

Any student who wishes to repeat a course to improve his grade in that course must do so before he completes a more advanced course in the same subject-matter field.

## GRADE POINT RATIO

A student's grade point ratio for any period is computed by dividing the total number of semester hours for which he received grades into the total number of grade points earned in that period. Grades of WF and F are included, but grades of WP are excluded.

Only the record made in course work for which the student was registered in this institution is used in determining his grade point ratio.

## GRADE REPORTS

**Preliminary Report:** A preliminary report of the student's progress is sent to the parent or guardian about eight weeks after the beginning of each semester.

**Semester Reports:** At the close of each semester, a report of the student's work during the semester is sent directly to the parent or guardian.

**Unsatisfactory Work:** During the session the deans receive reports from the members of the teaching staff on students doing unsatisfactory work. These reports form the basis for personal conferences with the students concerned and for special notices to parents and guardians.

**Reports to High Schools:** At the close of the first semester, a report is sent to each accredited high school showing the grades made by the freshmen entering the College from that school.

## DISTINGUISHED STUDENTS

A student who completes a semester schedule of at least 15 hours with no grade lower than C and with a grade point ratio of not less than 2.25 for the semester shall be designated as a "Distinguished Student". In official acknowledgment of the designation, he is issued a Distinguished Student card by the dean of his school.

As a recognition of his scholastic achievement, the College allows a Distinguished Student to present his card to the instructor during the next succeeding semester after he distinguishes and, without requirement or privilege of making up the work missed, absent himself from any theory class except for announced quizzes provided, however, that any student who without permission of the instructor leaves a class to which he has reported shall be given a grade of zero for the day's work. This privilege may be revoked for cause at any time by the dean of the student's school.

## HONORARY SCHOLASTIC SOCIETIES

Students ranking near the top of their class scholastically will be considered for admission to one or more of the national honorary societies described below. The honor societies are intended to reward the student of character and ability, and membership in them is a well-recognized mark of distinction which becomes a part of one's permanent record.

**Alpha Zeta.** This is the oldest national agricultural honor fraternity in the country. Election to membership is limited to junior and senior students in agriculture who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Eta Kappa Nu.** Electrical engineering majors are eligible for membership in this national honor society. It is open to junior students in the top one-fourth of their class and to senior students in the top one-third of their class.

**Iota Lambda Sigma.** This fraternity is a national society open to all Industrial Education majors. Students are required to have an overall grade point average of 1.50, and of 2.00 in Industrial Education courses for membership. The aim of this fraternity is to encourage scholarship, leadership, and service in the field of Industrial Education.

**Phi Eta Sigma.** Election to this freshman honor society is automatic upon attainment of a grade point ratio of 2.50 or better in all freshman work for one semester or more. The individual must have carried an academic load of at least 13 semester hours and must not have transferred more than 20 hours from another college.

**Phi Kappa Phi.** Open to all academic fields in the undergraduate school, this honor society elects its membership from those students who are within a year of graduation in a four-year course and are within the top one-tenth of their class scholastically. The student must have been registered one year in the College to be eligible. Graduate students with outstanding records who have satisfied the residence requirement are also eligible for membership.

**Phi Lambda Upsilon.** This is the oldest national chemical honor fraternity in the country. Election to membership is limited to junior, senior and graduate students in chemistry and chemical engineering who have achieved outstanding records of scholarship, character, and leadership in their chosen fields.

**Phi Zeta.** Students in the School of Veterinary Medicine who rank in the upper ten per cent of the junior class or upper twenty-five per cent of the senior class and who have a grade point ratio of at least 2.25 in their entire veterinary curriculum through the preceding semester are eligible for election to this honor society.

**Sigma Gamma Tau.** Aeronautical Engineering students may be elected by the present membership to this national honorary scholastic fraternity. The minimum grade point ratio is 2.00 for eligibility for this society.

**Sigma XI.** The object of this society is to encourage original investigation in science, pure and applied. It is open to graduate students and to staff members of the A. and M. College System who have shown a marked excellence in one or more departments of pure or applied science and given evidence of an aptitude for scientific research.

**Tau Beta Pi.** Students in the School of Engineering who rank in the top one-eighth of the junior class or top one-tenth of the senior class are eligible for election to this society. This is the oldest national engineering society founded for the purpose of recognizing scholarship.

## SCHOLASTIC PROBATION

Whenever a student's cumulative record indicates that he is failing to make satisfactory progress, he is considered as scholastically deficient. The cause of the deficiency will be investigated by the dean of his school, and the student may be placed on scholastic probation of such terms as the dean shall designate, or he may be required to withdraw from the College if the deficiency warrants.

Scholastic probation is a conditional permission for a student to continue in school after he has become scholastically deficient or after he has incurred an excessive number of unauthorized absences. This permission is granted by the dean of the student's school when an analysis of the deficiency indicates that a continuation is in the best interests of the student and the College.

## CLASSIFICATION

Sophomore, junior, and senior classification will be granted on completion of 30, 60, and 95 semester hours respectively.

## EXCESS HOURS

A student may register for the regular semester program in his curriculum if he is in good standing. With the dean's approval, necessary adjustments for minor irregularities may be authorized up to 20 hours. Registration for 21 hours or more may be approved under the following conditions:

| Hours | Grade Point Ratio Last Semester or Over-all |
|---|---|
| 21 | 1.50 |
| 22 | 2.00 |
| 23 | 2.25 |
| 24 | 2.50 |

The normal amount of work a student may carry in a six-week summer term is 6 semester hours (or 7 if part is practice). Hours in excess of a normal load may be authorized in certain cases by the student's dean in conformance with the limitations that apply during the academic year. For the entire summer session the maximum number permissible is 15 semester hours.

# TRAINING FOR GOVERNMENT SERVICE

## Government Employment

The United States Government employs many college graduates trained in specialized fields of engineering, agriculture, and the natural and social sciences for assignment either at home or abroad. In some instances experience is a desirable or necessary qualification for federal employment. Within fixed limits graduate study is normally accepted as the equivalent of experience. Except for positions of high rank, employment is on the basis of competitive examinations. Information concerning these opportunities and Civil Service examinations to qualify for them is readily obtainable from any United States Post Office or from the Civil Service Commission, Washington 25, D.C.

## Agricultural Foreign Service

Recently many specialists in agriculture have been appointed to administer technical programs of the United States in foreign countries. In addition to their own field of specialization, such technically trained candidates will often find some knowledge of foreign language (French, German, Portuguese, Russian, or Spanish) useful. They should likewise command a good knowledge of our own language, government and history, and economics. Students who are interested in such a program should at the earliest possible date confer with the Dean of Agriculture and the head of the subject matter department of major interest in order to work out a satisfactory degree program.

## The Foreign Service of the United States

Superior students who plan to take the examinations for career officers in the Foreign Service of the United States are urged to consult the Head of the Department of History and Government or the Dean of Arts and Sciences. In general they should follow a broad program of study with emphasis on English, foreign languages, history and government, economics, mathematics and statistics, literature, geography, anthropology, and similar courses. Those primarily interested in Latin America might refer to the paragraph on Latin American studies in the School of Arts and Sciences for some specific suggestions. Besides the general examinations on the reading of English and on vocabulary, on statistics and mathematics, on general knowledge, and on written English, candidates take special examinations on world or United States history and government, economics, and modern languages.

## PREPARATION FOR TEACHING

Teacher education is an important part of the college curriculum, so much that it is a college-wide enterprise. The Council on Teacher Education, an administrative body comprised of representatives from all departments engaged in teacher education, gives general direction to the institutional program. All of the teacher preparation programs are fully certified and meet the standards set forth by the State of Texas.

Students who decide on a career in teacher education will find the field offers many challenging opportunities for advancement. The good teacher should possess a keen desire to work understandingly with youths, their parents, and his professional associates.

A student may prepare for teaching by selecting a program in one of four departments of the College. These are the Department of Agricultural Education in the School of Agriculture; the Department of Education and Psychology and the Department of Health and Physical Education, both in the School of Arts and Sciences; and the Department of Industrial Education in the School of Engineering.

The student may choose a first and second teaching field from among those listed below:

**First Teaching Field**

Agricultural Education
Biology
Chemistry
English
Health and Physical Education
History
Industrial Arts Education
Industrial Vocational Education
Journalism
Mathematics
Modern Languages
Physics

**Second Teaching Field**

Biology
Business Administration
Chemistry
Driver Education
English
General Science
History
Journalism
Mathematics
Modern Languages
Physics

An approved graduate program is available to those who wish to do additional work in either the Departments of Agricultural Education, Industrial Education, or Education and Psychology. A minor program is offered by the Department of Health and Physical Education. Professional programs are approved for certification of superintendents, principals, supervisors, counselors, visiting teachers, and master teachers within subject-matter areas.

The Placement Office of the College endeavors to assist graduates and students of the College in securing suitable teaching positions and to assist boards of education and other officials in securing teachers. The Placement Office makes every effort to place candidates who register for the service in good positions. Information obtained from professors and others is confidential. No charge is made for this service.

### Education and Psychology

The Department of Education and Psychology coordinates the programs of teacher preparation in the academic areas commonly taught in the high school. Teaching majors or minors may be obtained in biology, chemistry, English, history, journalism, mathematics, modern foreign languages, physics, and business administration.

Students may choose to major in the Department of Education and Psychology or in the college department representing their subject-matter specialty. In either case the student must complete a 24-hour sequence in his principal teaching area and an 18-hour sequence in a second teaching area, or he must select a 48-hour approved program in the broad field of social studies or of natural sciences. In addition 24 hours of courses in education and psychology will be required for certification. Majors in the department itself will take 6 additional hours of professional education and will follow the four-year program outlined in the section of this catalogue devoted to the School of Arts and Sciences.

The Department offers a graduate program leading to the Master of Education or Master of Science degree. It prepares students for professional certification as master teachers or as superintendents, principals, supervisors, counselors, or visiting teachers. Certification at the professional level requires three years of teaching experience in addition to graduate level training.

### Health and Physical Education

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport· or (3) athletic trainer. Students completing the prescribed curriculum will be eligible for the Provisional All Grade Level Certificate in Health and Physical Education and a Provisional Secondary Certificate.

### Agricultural Education

Training provided in Agricultural Education prepares the prospective teacher to operate a program of vocational agriculture as an integral part of the high school educational system. Agricultural education majors may also qualify for a second teaching field in science. The curriculum in Agricultural Education provides a well-rounded education in areas involving teacher-student and teacher-community relationships, science, technical agriculture, and general education.

Courses involving teacher-student and teacher-community relationships offered in the agricultural education curriculum are educational psychology, principles of agricultural education, course building for in-school youth, Future Farmer and Young Farmer activities, adult education, methods of developing supervised farming programs, student teaching in vocational agriculture, and agricultural journalism. These courses are designed to develop basic educational philosophies, methods of selecting problems to be taught, and methods of teaching in-school youth, young farmers, and adult farmers.

Thirty semester hours involving science are included in the agricultural education curriculum. This exceeds the number of hours required for a teaching certificate in science.

A minimum of 58 semester hours in technical agriculture is required for agricultural education graduates. This provides an opportunity for the graduate to have a knowledge of the technical agriculture that is essential for successfully teaching vocational agriculture.

General education receives emphasis in the agricultural education curriculum. This includes courses in English, history, government, mathematics, and economics. This training prepares the prospective high school teacher of vocational agriculture to operate an efficient educational program in agriculture. Since this educational program includes both high school students and adult farmers, the prospective teacher must be technically and professionally competent.

### Industrial Education

The Department of Industrial Education offers two options in teacher preparation. Qualified students may pursue any of the courses of study described below with reasonable assurance of being able to secure a position in the field for which they have prepared.

#### Industrial Arts Education

Graduates of this curriculum may become industrial arts teachers in the junior and senior high schools of the state. (Industrial arts in these schools includes general shop, electrical work, woodwork, technical drawing, plastics, ceramics, leather, and other craft courses.) The post war industrialization of the Southwest has created many outstanding opportunities for the prospective industrial arts teacher.

### Vocational Industrial Education

The vocational industrial teacher education option in the industrial education curriculum is intended for teachers, supervisors, and directors for the vocational industrial schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, a candidate for a degree must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan. The Head of the Department of Industrial Education will assist the student in the preparation of his degree plan.

# COUNSELING AND GUIDANCE SERVICE

### Purposes

The Counseling and Testing Center provides testing, counseling, and guidance services to students and related consultative services to the faculty and staff.

### Counseling

At the Center a student will find professionally qualified counselors with whom he can discuss in confidence problems of a personal, vocational or educational nature. A student may request help of the Counseling and Testing Center, or he may be referred by a proper representative of the college, a parent, or other interested persons.

Counselors help the student better understand himself in order that his decisions—educational, personal, and vocational—will reflect maturity of judgment and a realistic appraisal of his abilities, interests, and aptitudes.

### Guidance

The group guidance program assists college students with problems which are common to most students—such as the choice of a course of study, how to study in college, improvement of college reading abilities, and a survey of fields of knowledge. A student may enroll voluntarily in any group guidance course of his choice, or he may be recommended for such a course by an advisor or counselor. These courses each carry one hour of college credit and may be used as electives in degree programs.

**Basic 102. Remedial Reading:** This laboratory course is designed to help students improve their reading rate, comprehension, and vocabulary.

**Basic 103. College Study:** This course is designed to help students to develop more effective study skills, time schedules, note-taking, examination skills, and basic textbook study methods. The course is not a tutoring course, but it will emphasize methods of efficient study.

**Basic 105. The World of Work:** This is a course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas are studied intensively, and each student is given an opportunity to study his aptitudes and interests, and to relate them to various vocational requirements.

Basic 105 is a required course for General Curriculum students, those students who are interested in attending A. and M. but have not decided upon a major field of study. In cooperation with the Dean of the School of Arts and Sciences, who administers the General Curriculum program, a counselor from the Counseling and Testing Center helps the student plan his program at some time prior to his registration for the first semester.

**Basic 106. Survey of Man's Knowledge:** This is a course recommended for the student who has his vocational goal more clearly in mind. The course acquaints the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature are investigated.

### Vocational Reading Room

For the use of students in the General Curriculum program and other students who are investigating vocations, a Vocational Reading Room is provided. Here up to date and objective information is maintained about most vocational fields. In addition, the student can be referred to professors on the campus who train students in the different professions and vocations.

### Remedial Services

Individual assistance is available for those with special difficulties in spelling, handwriting, functional vison and hearing, written expression, and problems in taking examinations. The Center also offers help to those students with minor speech disorders which do not require extensive treatment.

**Testing Service**

A complete and adequate program of testing is maintained both for group testing and individual testing. A battery of placement tests is required of each student before registering in the college. These tests are used for purposes of placement and counseling. The tests used in this battery include a college ability test, achievement tests in algebra, chemistry, and English, and a diagnostic reading test.

During the summer months several two-day counseling and testing clinics are offered on the campus. Normally, the clinics are held on a Friday and Saturday. Tests are administered during the day on Friday. A group interpretation is given on Friday evening. Saturday morning the student has a conference with the Dean or his representative of the school in which he desires to study. His scores are discussed and interpreted. Also, his courses for the fall will be outlined using his test scores, high school record, and experience to help in the decision. For those who are not able to attend the two-day clinics, several Saturday dates are offered for the purpose of taking the battery of tests. Further information regarding the testing program can be obtained by contacting the Director of the Counseling and Testing Center.

In their counseling activities, staff members often need additional information about the achievement, aptitudes, interests, and personality characteristics of students. This need is sometimes expressed by the students themselves. The student and counselor together select the most appropriate tests from the wide variety on hand, and the counselor remains available to interpret the results to the student. Test information is strictly confidential and is used only to help the student understand himself and to plan for his future. All students in the college are eligible for this service.

**The A. and M. Adjunct**

The A. and M. Adjunct is a summer school with a camp atmosphere for students entering college for the first time. The college has developed a beautiful campsite of 411 acres on the South Llano River in the heart of the Texas Hill Country, about one mile from Junction, Texas. Two six week terms are offered each summer.

A well rounded program for each student includes classwork, study, and recreation. The student takes seven hours of regular college work, usually college English, college math, and physical education. Teachers and counselors are available to help the student with problems that may arise.

At the first of each term every student is given a comprehensive group of tests. This group consists of aptitude, achievement and interest tests which aid the counselor in helping the student decide upon his course of study for the summer term and his future course of study to follow in college.

An organized inter-cabin competitive intramural program is offered. Also, swimming, canoeing and fishing activities are conducted in the cool, clear water of the South Llano River. An outdoor amphitheater is available for variety shows, motion pictures, and group meetings.

The A. and M. Adjunct is administered by the Counseling and Testing Center through the Dean of Instruction. In almost every case staff members come from the regular faculty of the A. and M. College. The Center works closely with the departments who offer courses in the instructional program. Students interested in this program should write or contact the Director of Admissions.

**General Curriculum.** The general curriculum is designed to meet the needs of the new student who has not decided upon a major field of study. It is arranged to assist the student in evaluating himself and in evaluating the several possible degree objectives, and at the same time to afford general courses that have application in almost all curricula. A student who decides upon his major field of interest by the beginning of the second semester may declare his degree objective and register for the courses outlined in that curriculum. If a student has not decided upon his degree objective by this time, he is advised to continue with the General Curriculum for the second semester.

## GENERAL CURRICULUM

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Basic 105**<br>The World of Work | (0-2) | 1 | **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics** | | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Elective** | | 10 |
| **Elective** | | 7 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | |
| | | 18 | | | 18 |

Assignment to the specific courses listed above will be made in conference with a member of the faculty and in accord with the student's achievement. The courses designated as mathematics and elective will be assigned in line with the requirements of the curriculum in which the student expresses greatest interest. General Curriculum students are under the academic supervision of the Dean of the School of Arts and Sciences.

As a part of the elective hours, a student may take either Biology 101, 107, 108, or Chemistry 101, 102 in the first and second semesters. Chemistry is required or is acceptable in more curricula than biology. A student evidencing a deficiency in mathematics may be required to delay chemistry a semester.

A student whose high school record and entrance tests indicate inadequate preparation may be required to register for either a reduced load or special courses designed to meet his need.

# THE SCHOOL OF AGRICULTURE

The various curricula in the School of Agriculture have as their main objectives the preparation of young men for farming, ranching, and other businesses associated with agriculture; for harvesting, processing, and marketing of food and fiber products; for the pursuit of scientific investigation in the broad field of agriculture, including soils, water and plant and animal products, both native and cultivated; for careers in teaching or extension work in agriculture; for work with various governmental and private agricultural agencies; or for the teaching of conservation and management of our natural and cultivated resources. Systematic training is given in the sciences of chemistry, physics, mathematics, and biology, all of which are fundamental to the study of scientific agriculture. The curricula offered give the student a wide range of choice in the selection of a major, and elective courses provide excellent opportunity for enlarging his field of learning in keeping with his individual interest and needs.

## FOUR-YEAR PROGRAMS

The following departments offer four-year programs:

- Agricultural Economics and Sociology
- Agricultural Education
- Agricultural Engineering
- Agronomy
- Animal Husbandry
- Dairy Science
- Entomology
- Floriculture
- Horticulture
- Poultry Science
- Range and Forestry
- Wildlife Management

## INTERDEPARTMENTAL CURRICULA

Appropriate committees administer interdepartmental curricula in:

- Animal Science
- Food Technology
- Plant and Soil Science

## AGRICULTURAL JOURNALISM

This curriculum is administered by the Department of Journalism in the School of Arts and Sciences.

## DEPARTMENTS NOT HAVING FOUR-YEAR PROGRAMS

- Biochemistry and Nutrition
- Genetics
- Plant Physiology and Pathology

These departments do not have four-year programs but do offer courses which are basic to many of the major fields in agriculture. A student interested in a career in any of these subject matter fields should consult with a member of the staff of the appropriate department and ask that professional opportunities in the field of his interest be described to him. The equivalent of a major in these subjects may be developed through the curriculum in animal science or in plant and soil science.

## TWO-YEAR PROGRAM IN FORESTRY

The present curriculum includes the first two years of forestry.

## AGRICULTURAL ECONOMICS AND SOCIOLOGY

Trained personnel are needed in the fields of marketing, farm and ranch management, agricultural policy and finance, agricultural statistics and outlook, land economics, consumer economics, and sociology.

## AGRICULTURAL ECONOMICS

### Agricultural Administration Option

The program in agricultural administration prepares students for employment with governmental and private agencies; in such positions as research workers, marketing specialists, agricultural agents of banks and business firms; as extension workers; and as salesmen and teachers. Electives in business administration prepare students for work in businesses related to agriculture. Electives in technical agriculture prepare a student who wishes to become a specialist in the marketing of a particular farm product.

### Farm Management Option

The program in farm management prepares students for the operation of farms and ranches and for professional and commercial work dealing with agriculture. Electives in technical agriculture permit students to emphasize the study of particular agricultural enterprises.

## SOCIOLOGY

### Human Relations Option

The program affords professional training in human relations with special emphasis on social problems, community development, social anthropology, social work, criminology and juvenile delinquency, population, institutions, and group organization. Graduates are qualified for employment as case workers, Chamber of Commerce directors, probation or parole officers, and Boy Scout executives.

### Rural Leadership Option

This program affords professional training in rural leadership. Training is given in both the human side and the technical side of agriculture for students preparing to become county agricultural agents, participants in foreign agricultural programs, rural ministers, agricultural missionaries, and leaders in rural development programs.

## AGRICULTURAL EDUCATION

This curriculum, which includes well balanced selections in various areas of technical agriculture, is designed to give the teacher of vocational agriculture the preparation and training in both technical agriculture and professional education, including student teaching, required to qualify under the Texas Plan for Vocational Education.

In addition to being qualified to teach vocational agriculture, graduates of this curriculum find employment with the Agricultural Extension Service and the Soil Conservation Service, in agricultural public relations work with banks, with Chambers of Commerce and news gathering and reporting agencies, and with industries related to agriculture.

## AGRICULTURAL ENGINEERING

The curriculum in agricultural engineering is under the joint supervision of the School of Agriculture and the School of Engineering. Agricultural engineering deals with the application of the fundamental branches of engineering to the peculiar conditions and requirements of agriculture as an industry and as a field of applied science. The term "agricultural engineer" denotes an engineer who has been trained in both engineering and agriculture, with experience in combining the two, and who is qualified to develop, design, organize, and direct engineering work in agriculture and closely allied industries.

In general, agricultural engineering may be broken down into five major phases of activity: power and machinery; agricultural structures design; farm electrification; agricultural process engineering; and soil and water control and conservation, which includes drainage, flood control, irrigation, and soil erosion control.

Graduates of this curriculum are prepared for service in teaching, extension, and research work; with government soil and water control projects; with manufacturers of farm equipment in advertising, sales, and design work; with engineering and contracting firms; with agricultural processing industries; and with building and equipment manufacturers.

## AGRICULTURAL JOURNALISM

The curriculum in agricultural journalism is designed to prepare students for professional careers as agricultural writers and editors, including work on bulletins and magazines as well as on rural and metropolitan newspapers, and in radio-TV broadcasting.

The first two years are planned to give students the fundamental studies. The program gives students an adequate background for general journalistic work and affords them opportunities to prepare themselves as specialists in certain phases of agricultural writing.

## AGRONOMY

The program in agronomy prepares students for work in the broad fields of soil management and crop production. Agronomic training gives the student a thorough understanding of the basic sciences and, in addition, teaches him how to apply this knowledge in the improvement of crops and soils. The first phase of training includes such subjects as mathematics, chemistry, botany, entomology, bacteriology, genetics, and plant physiology. Specialized courses in plant and soil science, which emphasize efficient crop production practices and the conservation and improvement of our soils, are provided in the last two years of the curriculum.

The agronomy graduate is well trained in those subjects dealing with crops and soils and is qualified for the numerous activities related to his field of training. Professional opportunities include those in farming, farm management, and land appraisal; in fertilizer manufacture and sales, seed companies, grain marketing and milling, and agricultural equipment and supply businesses; in extension and education as county agents, extension specialists, college instructors, agricultural public relation specialists and agricultural editors and directors; and in technical fields with the Agricultural Experiment Stations, United States Department of Agriculture and Soil Conservation Service.

## ANIMAL HUSBANDRY

The Department of Animal Husbandry offers training for the future producers, processors, extension personnel, and scientists of the livestock industry.

### Facilities

The Animal Industries Building houses the offices, classrooms, meats laboratory, library, and some of the research facilities of the Department. The Department farm of 1,280 acres is adjacent to the campus and maintains pure bred herds of cattle, swine, sheep, and horses for use in teaching, research, and extension. Additional grade and crossbred cattle are located at the College plantation a short distance from the campus. Modern barns and equipment are utilized in teaching the latest methods of production and marketing. A complete meats laboratory is equipped to slaughter, process, and preserve all classes of livestock. Student help in the department is utilized to the fullest extent to provide students with financial assistance as well as valuable experience in handling livestock.

### Curricula

Two selections of curricula are offered students interested in livestock: production option and commercial option.

The production option is designed to meet the needs of future ranch managers, breed association fieldmen, county agents, livestock buyers, farm and ranch reporters, and related agricultural groups. The student will take courses in agronomy, range and forestry, animal breeding, and veterinary medicine as well as courses in animal husbandry. Elective courses are selected by the student with the aid of the departmental advisor.

The commercial option is designed to meet the needs of future meat plant operators, feed industry personnel, livestock market personnel, pharmaceutical representatives, and related agricultural interests. Courses are offered in accounting, personnel management, business law, and psychology, in addition to the basic animal husbandry courses. Elective course are selected with the aid of the departmental advisor.

Through the proper choice of elective courses, students may form a foundation for graduate study in either curriculum option. However, the interdepartmental animal science curriculum is planned especially for students preparing for graduate study.

## DAIRY SCIENCE

Trained personnel are much in demand to aid, service, manage, and direct the production, manufacture, and distribution of milk and dairy foods so important in the human diet.

### Dairy Manufacturing

This major is designed to prepare students for dairy plant operation and management; plant field work and dairy product quality control; teaching and research work in milk and dairy food processing; merchandising and sales. Fundamental technical and business courses give a well rounded preparation for careers in the dairy industry and allied fields.

### Dairy Production

This major is designed to prepare students for careers as dairy farm operators or managers; as dairy herd owners and breeders of dairy cattle; as teachers and research workers in dairy nutrition, breeding, or management; as extension dairy specialists and organization leaders and as workers in allied fields.

## ENTOMOLOGY

The program in entomology is intended to prepare students for careers in either research, extension, teaching, business, or industry. The curriculum includes basic studies in insect taxonomy, morphology, physiology, toxicology, and economic entomology. It also includes fundamental subject matter in the various fields of agriculture as well as in the biological sciences.

## FLORICULTURE

Floriculture is that branch of agriculture concerned with the production, distribution, and marketing of ornamental plants and plant products.

The program in floriculture includes sound preparation in such sciences as botany, soils, entomology, and genetics to enable a graduate to breed, propagate, and distribute improved varieties of onamental plants, and to arrange and maintain them properly in landscape developments.

Floriculture is a business as well as a science, and the curriculum is designed to provide preparation for the highly technical and specialized growing operations of florist or nursery crop production, as well as specialized training for landscape activities, and for positions in associated industries requiring sales people, floral designers, managers, executives, and experts in the packing, shipping, and storage operations connected with flower crops and nursery stock. Opportunities for employment also exist in the fields of teaching, research, and extension.

## HORTICULTURE

This program includes fundamental courses and specialized training in fruit growing, vegetable growing, plant propagation, and the processing of horticultural crops. Graduates are prepared for work as operators and owners of fruit orchards, vegetable farms, nurseries, and commercial processing plants. The training is also valuable for careers in teaching, extension, and research work in horticulture and related fields.

## POULTRY SCIENCE

The growth of the poultry industry and the need for a rapid expansion of scientific and technical knowledge in the various fields of science basic to successful poultry production have supplied the motivation for the development of courses in this phase of agriculture. In no field of agriculture is an understanding of the science and practice of feeding, breeding, physiology, pathology, heating, ventilation, processing, and marketing more necessary or more rewarded than in the modern intensive methods of producing poultry meat and eggs. Undergraduate students are trained to operate commercial poultry farms, hatcheries, feed mills, and poultry processing plants. They also find employment with such allied industries as feed manufacturers, equipment distributors, and manufacturers of vaccines and biologics, with poultry publications, and with the Extension Service. Many graduates in poultry science choose to take graduate work in this and allied fields.

## RANGE MANAGEMENT

This curriculum is designed to give students a thorough understanding of the great variety of problems met in the multiple use and conservation of noncultivated grazing lands. The first phase of training includes work in the physical, biological, and social sciences. Specialized courses in range management, range ecology, agrostology, forestry and conservation of natural resources are included in the last two years.

Graduates are prepared to enter the ranch business as owners or managers, for work as county agricultural agents, for work with Experiment Stations, and as college teachers in this field. A Bachelor's degree in range management gives the student the background for study toward advanced degrees. Men meeting Civil Service requirements are eligible for appointment with several United States Government agencies.

## WILDLIFE MANAGEMENT

This curriculum includes work in all phases of fisheries and wildlife. At the beginning of the sophomore year, the student should elect one of the two options, fisheries or wildlife, because of difference in the basic sciences required. The junior and senior years are largely years of specialization.

This curriculum is designed (1) to train young men in the art of managing wildlife on the land and of maintaining populations at levels consistent with good land-use practices and the desirability of the wildlife species involved; (2) to train men for research in taxonomy, distribution, and ecology of fishes, reptiles, amphibians, birds, and mammals; and (3) to train men for teaching at the high school and university levels. Opportunities are provided also, in cooperation with the Departments of Journalism and of Education, for training in the field of wildlife journalism and conservation education. For students planning on careers in research and/or teaching at the college level, an advanced degree will be required.

Upon completion of the wildlife management curriculum, graduates are prepared to enter occupations in the fisheries and/or wildlife fields, including management, research, teaching, and public relations. Men meeting Civil Service requirements are eligible for appointments with the United States Fish and Wildlife Service and other federal agencies. Also, graduates are eligible for employment by the various state game and fish commissions. A few positions are open from time to time as wildlife managers on private ranches and as writers of articles on outdoor life.

## INTERDEPARTMENTAL CURRICULA

The curricula in animal science, food technology, and plant and soil science are designed for students who are interested in the more technical and scientific problems in agriculture. There is an increasing demand from industry and from the field of agricultural research for trained men in each of these curricula. They have no separate department, but a student interested in a given curriculum should select his electives in the department in which he is most interested.

### Animal Science

Those who complete the curriculum in animal science will be qualified for graduate work in the fields of nutrition, animal breeding, genetics, physiology of reproduction, zoology, bio-statistics, and related fields. At the same time they are qualified for many of the positions available to graduates with a major in one of the animal curricula in the School of Agriculture.

### Food Technology

The curriculum in food technology is designed to train students in the technical and scientific problems of food processing and manufacturing. This course of study includes a number of elective hours, enabling the student to take major work in production, processing, inspection, and grading of dairy products, fruit and vegetable products, and miscellaneous foods and beverages. Students majoring in this curriculum are under the supervision of a committee on food technology, appointed from the agricultural teaching staff by the Dean of Agriculture.

### Plant and Soil Science

The curriculum in plant and soil science is designed to give students a technical background for the fields of plant breeding, plant pathology, plant physiology, turf management, soil fertility, soil physics and mineralogy. At the same time students are qualified for many other positions available to graduates with a major in one of the other plant curricula in the School of Agriculture.

The curriculum emphasizes the sciences of botany and chemistry but also gives a firm foundation in mathematics, English, and other liberal arts and agricultural courses.

## FORESTRY

The two-year curriculum in forestry provides the student with fundamental courses necessary for him to enter a southern accredited school of forestry with junior standing. In addition to the arts and sciences, the curriculum includes the basic courses of plane surveying, agronomy, ecology, and forestry. The curriculum provides the fundamentals for study in the propagation, protection, and management of commercial timbers, the processing and manufacture of wood products, and the conservation of all products derived from forests. All accredited southern forestry schools have approved the curriculum as adequate to permit the student to obtain his Bachelor of Science degree in forestry upon the completion of two additional years of study. The Texas Legislature has provided funds which are available to defray certain out-of-state expenses for Texas students who attend accredited southern forestry schools for the junior and senior years.

During the junior and senior years, the forestry student has the opportunity to specialize in forest production, forest utilization, wood technology, pulp and paper technology, wood products merchandising, or extension and public relations forestry.

A degree from an accredited school of forestry prepares the graduate for work in the fields of forest administration, management, research, and education.

## Curricula in
## AGRICULTURE

(For Majors in Agronomy, Dairy Manufacturing, Dairy Production, Entomology, Horticulture, Poultry Science)

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

NOTES:
1. Electives shall be selected and substitutions made with the advice of the head of the student's major department.
2. At least 16 but not more than 24 credit hours of advanced courses in the student's major department shall be permitted toward requirements for graduation.

## For a Major in AGRONOMY

### FRESHMAN YEAR

(See page 115)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Liberal Arts 311**<br>Use of Library Resources | (0-2) | 1 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products<br>Or | (3-0) | |
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agronomy 306**<br>Grain and Fiber Crops | (3-2) | 4 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 10 |
| | | 18 |

## For A Major in
## ANIMAL HUSBANDRY

### Commercial Option

(For students primarily interested in the meat, feed, or other related livestock industries)

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students<br>of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 307**<br>Meats | (2-3) | 3 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | |
| **Or** | | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Veterinary Anatomy 202**<br>Veterinary Anatomy | (1-6) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Animal Husbandry (Elective)** | | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 437**<br>Marketing and Grading of<br>Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## For A Major in
## ANIMAL HUSBANDRY

### Production Option

(For students primarily interested in livestock production and related problems)

## FRESHMAN AND SOPHOMORE YEARS

(Same as for Commercial Option, page 117)

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records<br>and Accounts<br>**Or**<br>**Business Administration 227**<br>Principles of Accounting | (2-2)<br><br><br><br>(3-3) | 3 or 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Animal Husbandry 433**<br>Reproduction in Farm Animals | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Microbiology 301**<br>Microorganisms in Animal Diseases | (1-4) | 2 |
| **Elective** | | 3 or 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 309**<br>Feeds and Feeding | (2-2) | 3 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering (Elective)** | | 3 |
| **Agronomy 308**<br>Forage Crops<br>**Or**<br>**Range and Forestry 401**<br>Range Improvement and<br>Maintenance | (2-2)<br><br><br>(2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **Animal Husbandry 437**<br>Marketing and Grading of<br>Livestock and Meats | (2-2) | 3 |
| **Animal Husbandry 481**<br>Seminar | (1-0) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Veterinary Parasitology 487**<br>Parasites of Farm Animals<br>and Poultry | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## For a Major in
## DAIRY MANUFACTURING

### FRESHMAN YEAR

(See page 115 with the addition of the following note: Students who expect to major in dairy manufacturing may substitute Mathematics 103 or 110 for Poultry Science 201 or Entomology 201.)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 | **Dairy Science 311**<br>Technical Control of Dairy Products | (2-6) | 4 |
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 | **Dairy Science 316**<br>Butter and Cheese Manufacture | (3-4) | 4 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 4 | **Elective** | | 5 |
| | | 18 | | | 18 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Dairy Science 407**<br>Ice Cream Manufacturing | (2-3) | 3 |
| **Dairy Science 415**<br>Condensed and Powdered Milk | (2-2) | 3 | **Dairy Science 410**<br>Dairy Plant Management | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men<br>Or | (3-0) | | **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 18 | | | 18 |

## For a Major in
## DAIRY PRODUCTION

### FRESHMAN YEAR

(See page 115 with the addition of the following note: Students who expect to major in dairy production may substitute Mathematics 103 or 110 for Poultry Science 201.)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Dairy Science 301**<br>Market Milk | (3-2) | 4 |
| **Dairy Science 303**<br>Dairy Cattle Judging | (0-3) | 1 |
| **Dairy Science 320**<br>Bacteriology of Dairy Products | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 2 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Dairy Science 417**<br>History and Development of Dairy Cattle | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Dairy Science 324**<br>Commercial Dairy Products | (3-0) | 3 |
| **Dairy Science 418**<br>Feeding and Management of Dairy Cattle | (3-2) | 4 |
| **Dairy Science 481**<br>Seminar | (1-0) | 1 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

## For a Major in ENTOMOLOGY

### FRESHMAN YEAR

(See page 115)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 | **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Elective** | | 5 |
| **Elective** | | 3 | | | 18 |
| | | 18 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 | **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 6 | **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| | | | **Elective** | | 3 |
| | | 18 | | | 18 |

## For a Major in FLORICULTURE

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Floriculture 224**<br>Principles of Floral Designing | (1-3) | 2 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Floriculture 221**<br>Fundamentals of Floriculture | (1-3) | 2 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Floriculture 320**<br>Garden Flowers | (1-3) | 2 |
| **Floriculture 319**<br>Exotic Plants | (1-3) | 2 | **Floriculture 325**<br>Marketing of Ornamental Plants | (3-0) | 3 |
| **Floriculture 327**<br>Management Techniques of Floriculture | (1-3) | 2 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 | **Elective** | | 5 |
| **Elective** | | 4 | | | 18 |
| | | 18 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 428**<br>Turf Management | (2-2) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Floriculture 424**<br>Propagation of Ornamental Plants | (2-2) | 3 |
| **Floriculture 429**<br>Greenhouse Crop Production | (3-3) | 4 | **Floriculture 430**<br>Nursery Crop Production | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 9 |
| | | 18 | | | 18 |

NOTES:

1. Students planning to do graduate work in plant science should elect Chemistry 227 and 228 in the sophomore year in place of Chemistry 231 and Floriculture 224.
2. Students interested in landscape construction and maintenance should elect Landscape Architecture 302 in the junior year and Landscape Architecture 305 in the senior year.

## For a Major in HORTICULTURE

## FRESHMAN YEAR

(See page 115)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Horticulture 311**<br>Processing Horticultural Crops | (2-3) | 3 |
| **Horticulture 322**<br>Vegetable Crops Management | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 2 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Horticulture 319**<br>Orchard Management | (2-2) | 3 |
| **Elective** | | 6 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men<br>**Or** | (3-0) | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Horticulture 481**<br>Seminar | (1-0) | 1 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Entomology 405**<br>Horticultural Pests | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## For a Major in
## POULTRY SCIENCE

## FRESHMAN YEAR
(See page 115)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Poultry Science 411**<br>Poultry Feeding | (3-2) | 4 |
| **Veterinary Physiology and Pharmacology 323**<br>Physiology of Farm Animals | (2-2) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Poultry Science 303**<br>Turkey Production | (2-0) | 2 |
| **Poultry Science 308**<br>Hatchery Management | (2-3) | 3 |
| **Veterinary Microbiology 334**<br>Poultry Diseases | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | |
| **Or** | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Poultry Science 309**<br>Broiler Production | (2-2) | 3 |
| **Poultry Science 407**<br>Technology and Marketing of Poultry and Poultry Products | (2-2) | 3 |
| **Poultry Science 414**<br>Poultry Breeding | (2-2) | 3 |
| **Elective** | | 3 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Poultry Science 482**<br>Poultry Seminar | (1-0) | 1 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### Curricula in

## AGRICULTURAL ECONOMICS AND SOCIOLOGY

### Curriculum in

## AGRICULTURAL ECONOMICS

## AGRICULTURAL ADMINISTRATION OPTION

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | |
| **Or** | | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 323**<br>Economic Analyisis | (3-0) | 3 |
| **Elective** | | 4 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | |
| **Or** | | |
| **Agricultural Economics 452**<br>International Trade and Agriculture | (3-0) | 3 |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 324**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Agricultural Economics 430**<br>Agricultural Finance | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. AGRICULTURAL BUSINESS ADMINISTRATION: Students preparing for work with business concerns allied with agriculture should elect from 9 to 18 credit hours of work in business administration and economics.
2. AGRICULTURAL MARKETING: Students preparing for work in agricultural marketing should elect from 9 to 18 hours in courses dealing with the production, grading, and marketing of commodities.
3. AGRICULTURAL ECONOMICS: Students preparing for professional work in agricultural economics and expecting to take graduate training should elect courses in the various social sciences, including courses in advanced economic theory.
4. Not more than 6 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.

# FARM MANAGEMENT OPTION

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Dairy Science 202**<br>Dairying<br>**Or** | (2-2) | |
| **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 321**<br>Farm and Ranch Records and Accounts | (2-2) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 323**<br>Economic Analysis | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Elective** | | 1 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 324**<br>Agricultural Prices | (3-0) | 3 |
| **Agricultural Economics 432**<br>Farm and Ranch Organization and Operation | (2-2) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Elective** | | 5 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Electives shall be chosen and approved according to the following policy:

1. Not more than 9 elective hours of advanced courses in agricultural economics will be permitted toward requirements for graduation.
2. Other electives shall be selected with view to strengthening the student's preparation for farm operation and closely related agencies and businesses.

## Curriculum in SOCIOLOGY

## HUMAN RELATIONS OPTION*

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | |
| **Or** | | |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Elective** | | 6 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Elective** | | 5 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Education 321**<br>Secondary School Methods | (3-0) | |
| **Or** | | |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Sociology 314**<br>Social Problems | (3-0) | 3 |
| **Elective** | | 8 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Journalism 406**<br>Publicity and Public Relations | (3-0) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

NOTE: All electives must be approved by the Head of the Department. Not more than 9 elective credit hours of advanced courses in sociology may be applied toward requirements for graduation.

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*For students preparing to become Chamber of Commerce executives, probation or parole officers, YMCA secretaries, personnel in social work, etc.

## RURAL LEADERSHIP OPTION*

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 105**<br>Introduction to Agricultural Economics | (3-0) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Sociology 320**<br>Social Anthropology | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Range and Forestry 401**<br>Range Improvement and Maintenance | (2-3) | 3 |
| **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Sociology 306**<br>Principles of Social Work | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

### SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Agricultural Economics 413**<br>Agricultural Cooperatives | (3-0) | |
| **Or** | | |
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Agricultural Economics 481**<br>Seminar | (1-0) | 1 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Sociology 404**<br>Rural Community Development | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Sociology 315**<br>The Family | (3-0) | 3 |
| **Elective** | | 7 |
| | | 18 |

NOTE: Not more than 9 elective hours of advanced courses in sociology may apply toward graduation.

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*For students preparing to participate in foreign agricultural programs or to become county agricultural agents, rural ministers, agricultural missionaries, etc.

## Curriculum in AGRICULTURAL EDUCATION

### FRESHMAN YEAR
(Same as for Agriculture, page 115)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Agricultural Engineering 325**<br>Farm Electricity | (2-2) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Education 301**<br>Principles of Agricultural Education | (3-0) | 3 |
| **Agricultural Engineering 221**<br>Farm Shop | (1-3) | 2 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Government 305**[1]<br>Government of the United States and Texas | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Education 427**<br>Methods of Developing Farming Programs | (1-2) | 2 |
| **Agricultural Engineering 222**<br>Farm Shop | (1-3) | 2 |
| **Agricultural Engineering 335**<br>Water Control and Utilization | (2-3) | 3 |
| **Agronomy 308**<br>Forage Crops | (2-2) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 20 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Economics 325**<br>Principles of Farm and Ranch Management | (2-2) | 3 |
| **Agricultural Education 431**<br>Student Teaching in Vocational Agriculture | (2-0) | 2 |
| **Agronomy 318**<br>Soil Conservation | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Agricultural Education 425**<br>Course Building | (2-0) | 2 |
| **Agricultural Education 426**<br>Methods in Adult Agricultural Education | (2-0) | 2 |
| **Agricultural Education 432**[2]<br>Student Teaching in Vocational Agriculture | (2-6) | 4 |
| **Animal Husbandry 416**<br>Livestock Management | (1-2) | 2 |
| **Dairy Science 420**<br>Dairy Management | (1-2) | 2 |
| **Poultry Science 401**<br>Management and Selection | (1-2) | 2 |
| **Elective** | | 3 |
| | | 17 |

NOTES:

1. Students who do not have credit for three hours of Basic ROTC must take Government 306 and 307 in place of Government 305.
2. Laboratory hours in Agricultural Education 432 are to include six weeks of student teaching.
3. Electives will be primarily in the field of technical agriculture subject to departmental approval.

## Curriculum in

# AGRICULTURAL ENGINEERING

## FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Agricultural Engineering 208**<br>Farm Machinery | (2-3) | 3 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 301**<br>Agricultural Structures Design | (2-3) | 3 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 324**<br>Agricultural Engine and Tractor Design | (2-3) | 3 |
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Agricultural Engineering 418**<br>Agricultural Process Engineering | (2-3) | 3 |
| **Agricultural Engineering 428**<br>Soil and Water Conservation Engineering | (2-3) | 3 |
| **Agricultural Engineering 481**<br>Seminar | (1-0) | 1 |
| **Agronomy 445**<br>Soil Physics | (2-3) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Agricultural Engineering 410**<br>Irrigation and Drainage Engineering | (2-3) | 3 |
| **Agricultural Engineering 413**<br>Agricultural Structures Design | (2-3) | 3 |
| **Agricultural Engineering 430**<br>Farm Electrification Engineering | (2-3) | 3 |
| **Agricultural Engineering 482**<br>Seminar | (1-0) | 1 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| | | 16 |

## Curriculum in
## AGRICULTURAL JOURNALISM

### FRESHMAN YEAR

(Same as for Agriculture, page 115)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 | **Agricultural Engineering 201**<br>Farm Power and Machinery | (2-2) | 3 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Journalism 201**<br>News Writing | (2-3) | 3 | **Horticulture 201**<br>General Horticulture | (2-2) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 | **Journalism 311**<br>Radio and Television News Writing | (2-2) | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 | **Journalism 315**<br>Photography | (1-3) | 2 |
| **Elective** | | 4 | **Elective** | | 7 |
| | | 18 | | | 18 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Agricultural Economics 429**<br>Agricultural Policy | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 326**<br>History of Texas | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Journalism 410**<br>Publications Editing and Designing | (1-3) | 2 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 | **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 | **Elective** | | 7 |
| **Elective** | | 4 | | | |
| | | 18 | | | 18 |

NOTE: Electives shall include at least 10 hours of advanced courses in agriculture.

## Curriculum in
## ANIMAL SCIENCE

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Animal Husbandry 107**[1]<br>General Animal Technology | (2-3) | 3 | **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective**[2] | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 217**<br>Comparative Anatomy<br>of Vertebrates<br>Or | (2-4) | |
| **Biology 343**<br>Histology | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Biology 344**<br>Embryology | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Biochemistry and Nutrition 410**[3]<br>Introductory Biochemistry | (3-3) | 4 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 9 |
| | | 17 |

NOTES:
1. Dairy Science 202 or Poultry Science 201 may be substituted.
2. Entomology 201 or 208 or Chemistry 226 is recommended.
3. Animal Husbandry 303 plus 1 hour of elective, or Poultry Science 411 may be substituted.
4. The student planning further study in animal husbandry, biochemistry and nutrition, dairy science, genetics, or poultry science should select suitable elective courses with the advice of the head of the appropriate department.

## Curriculum in FOOD TECHNOLOGY

### FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and<br>Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Elective** | | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Economics 314**<br>Marketing Agricultural Products | (3-0) | 3 | **Agricultural Engineering 213**<br>Food Plant Engineering | (2-3) | 3 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Dairy Science 326**<br>Food Preservation<br>and Decomposition | (3-3) | 4 |
| **Elective** | | 8 | **Elective** | | 7 |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 | **Biochemistry and Nutrition 401**<br>Human Nutrition | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 7 | **History 326**<br>History of Texas | (3-0) | 3 |
| | | 19 | **Elective** | | 3 |
| | | | | | 19 |

NOTE: Students enrolled in food technology will select an option in meat, dairy, horticulture, or poultry products and, with the counsel of a member of the Food Technology Committee, will prepare a plan of study for his approval.

## Two-Year Curriculum in FORESTRY

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Range and Forestry 102**<br>Introduction to Range<br>and Forestry | (1-0) | 1 |
| | | 16 | **Physical Education 102** | (0-2) | R |
| | | | | | 18 |

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

NOTE: Students who complete this two-year curriculum may continue their work for a degree in forestry in any accredited Southern forestry school. Funds have been appropriated by the Texas Legislature to help defray certain out-of-state expenses for Texas students attending such schools for their junior and senior years.

## Curriculum in
## PLANT AND SOIL SCIENCE

### FRESHMAN YEAR

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 4 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

NOTE: Students must select all electives with the advice of the head of the department in which they expect to take their major work.

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 4 |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Plant Physiology and Pathology 314**<br>Principles of Plant Physiology | (3-3) | 4 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **History 325**<br>Trends in American History | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **History 326**<br>History of Texas | (3-0) | 3 |
| **Elective** | | 12 |
| | | 18 |

## Curriculum in
## RANGE MANAGEMENT

### FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | (2-3) | 3 |
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 102**<br>Introduction to Range and Forestry | (1-0) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 202**<br>Range Plants | (2-3) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Agronomy 105**<br>Fundamentals of Crop Production | (2-2) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Geology 309**<br>Agricultural Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Animal Husbandry 303**<br>Animal Nutrition | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Range and Forestry 303**<br>Agrostology | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Range and Forestry 308**<br>Forest Management | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Animal Husbandry 406**<br>Beef Cattle Production | (2-2) | |
| **Or** | | 3 or 4 |
| **Animal Husbandry 414**<br>Sheep, Goats, and Fiber Technology | (3-2) | |
| **Range and Forestry 304**<br>Range Management | (2-3) | 3 |
| **Range and Forestry 309**<br>Silvics and Silviculture | (2-3) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |
| **Elective** | | 6 or 5 |
| | | 18 |

| Second Semester | | Credit |
|---|---|---|
| **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Agronomy 310**<br>Soil Morphology | (1-3) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | |
| **Or** | | |
| **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Range and Forestry 409**<br>Advanced Range Management | (2-3) | 3 |
| **Elective** | | 7 |
| | | 18 |

## Curriculum in
## WILDLIFE MANAGEMENT

## FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 101**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 |
| **Range and Forestry 203**<br>Dendrology | (1-3) | 2 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 |
| **Range and Forestry 204**<br>Dendrology | (2-3) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 |
| **Elective** | | 6 |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Range and Forestry 301**<br>Plant and Range Ecology | (2-3) | 3 |
| **Sociology 407**<br>Human Relations in Agriculture | (3-0) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Elective** | | 6 |
| | | 19 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Agricultural Economics 422**<br>Land Economics | (3-0) | 3 |
| **Genetics 406**<br>Statistics | (2-2) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 | **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 | **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Elective** | | 7 | **Wildlife Management 408**<br>Techniques of Wildlife Management | (2-3) | 3 |
| | | 18 | **Elective** | | 3 |
| | | | | | 18 |

## FISHERIES OPTION

## FRESHMAN YEAR

(See page 136)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 223**<br>Elementary Quantitative Analysis | (2-3) | 3 | **Chemistry 231**<br>Elementary Organic Chemistry | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 19 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Agronomy 301**<br>Soil Science | (3-2) | 4 |
| **Entomology 313**<br>Biology of Insects | (2-3) | 3 | **Biology 344**<br>Embryology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Physics 213**<br>Physics for Students of Agriculture | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology (Fresh Water) | (2-3) | 3 | **Wildlife Management 312**<br>Ichthyology (Marine) | (2-3) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 19 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 | **Genetics 406**<br>Statistics | (2-2) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Journalism 415**<br>Agricultural Journalism | (2-2) | 3 |
| **Wildlife Management 417**<br>Biology of Fishes | (2-2) | 3 | **Wildlife Management 410**<br>Conservation and Management of Fishes | (3-0) | 3 |
| **Elective** | | 7 | **Elective** | | 9 |
| | | 17 | | | 18 |

NOTES:

1. Majors in the wildlife management option must participate in the summer field course, Wildlife Management 300, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.
2. Majors in the fisheries option must participate in the summer field course, Wildlife Management 400, or submit evidence of satisfactory summer employment as biologists' aid with a state game and fish commission, the U. S. Fish and Wildlife Service, or other agency.

# THE SCHOOL OF ARTS AND SCIENCES

## CURRICULA

### LIBERAL ARTS

- Economics
- English (Language and Literature)
- History and Government
- Journalism
- Mathematics
- Modern Languages
- Studies Preparatory to Law

### BUSINESS ADMINISTRATION

- Accounting
- Building Products Marketing
- Finance
- General Business
- Insurance
- Marketing
- Personnel Administration

### PREPARATION FOR TEACHING

- Education
- Physical Education
- Psychology

### SCIENCE

- Botany
- Chemistry
- Entomology
- Meteorology
- Microbiology
- Physics
- Studies Preparatory to Medicine and Dentistry
- Zoology

### COMBINED DEGREE PLAN

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees — the Bachelor of Science degree in engineering, in the sciences, or in teacher training; or the Bachelor of Business Administration and the Bachelor of Arts degree in one of the liberal arts curricula. The student contemplating such a program should have a two-year grade point ratio above the normal minimum requirements and should consult with the heads of both departments and the deans concerned prior to formulating a combined degree plan.

### REQUIREMENT OF PROFICIENCY IN WRITTEN ENGLISH

In order to qualify for candidacy for a degree in the School of Arts and Sciences, all students majoring in departments of this school (Division of Business Administration; Departments of Biology, Chemistry, Economics, Education and Psychology, English, Health and Physical Education, History and Government, Journalism, Mathematics, Modern Languages, Oceanography and Meteorology, and Physics) must first demonstrate their ability to express themselves in acceptable English by passing a written examination in English composition. This examination must be taken not later than the spring semester of the junior year. Each student who fails to make a passing grade on a qualifying examination will be required to report to the Department of English for assignment for remedial work, which the student must complete satisfactorily without degree credit. Only if the Department of English has certified satisfactory completion of such remedial work and the student has passed his examination will the student be granted regular status as a candidate for a degree.

### ELECTIVES

In all curricula, elective hours are shown distributed over several semesters (one, two, or more a semester). The student is not expected to schedule his elective courses only in the units listed. He is free to schedule electives in whatever units he chooses up to and beyond the total number of elective hours in his curriculum. He may also exceed the hour requirement in any semester provided only that his record entitles him to carry the desired number of hours. A student will normally be expected to take electives in accordance with his academic classification.

It is recommended that most of the elective courses be in fields other than the major, and that the student take at least one course outside his major field during each semester of his junior and senior years. For example, where possible a student in one of the curricula in business administration should choose electives outside the Division of Business Administration; the major in science should elect courses in the humanities and social sciences; and students in economics or history should elect courses in the natural sciences, in the humanities, and in business administration.

### LATIN AMERICAN STUDIES

A number of departments offer courses relating to Latin America, so that it is possible for many students (including some who are registered in the other schools of the College) to combine some concentration in Latin American studies with their regular departmental major. The program of offerings on Latin America is designed to meet the needs of four classes of students: (1) those who expect to enter into business in Latin America or into trade with Latin America; (2) those who contemplate a career in the foreign service of the United States Government or in any of the several government agencies in Washington which employ specialists on Latin America, with assignments both in the United States and in the foreign field; (3) those who expect to enter into teaching or research with emphasis upon Latin America; and (4) those who wish to broaden their education and acquire a better understanding of the people and the problems of Latin America. Any student who elects to coordinate some study of Latin America with a regular major in one of the College departments should consult the head of his major department for guidance in working out his program of study.

Those courses which bear directly on Latin America include the following:

| | | |
|---|---|---|
| **Geography 201**<br>Principles of Geography | **(3-0)** | 3 |
| **Geography 303**<br>Geography of South America | **(3-0)** | 3 |
| **History 313**<br>The Latin-American Nations to 1820 | **(3-0)** | 3 |
| **History 314**<br>The Latin-American Republics, 1820 to the Present | **(3-0)** | 3 |
| **History 422**<br>International Rivalry in the Gulf-Caribbean Area, 1840 to the Present | **(3-0)** | 3 |
| **Modern Language 305**<br>Modern Spanish-American Drama | **(3-0)** | 3 |
| **Modern Language 306**<br>Modern Spanish-American Drama | **(3-0)** | 3 |
| **Modern Language 325**<br>Public Speaking in Spanish | **(1-2)** | 2 |
| **Modern Language 326**<br>Public Speaking in Spanish | **(1-2)** | 2 |
| **Modern Language 335**<br>Spanish-American Novel | **(3-0)** | 3 |
| **Modern Language 336**<br>Spanish-American Novel | **(3-0)** | 3 |

## LIBERAL ARTS

The curricula in liberal arts leading to the degree of Bachelor of Arts offer carefully planned programs of study in selected areas of the humanities and social sciences. They are intended for students whose interests, abilities, and aims are better served by a broad general education than by more specialized technological and scientific studies.

After completing one of these curricula, many students enter directly upon their life work. Others make their liberal arts course the foundation for additional education in a professional or graduate school. Special provision is made for those who wish to begin the study of law before they have completed the program for the Bachelor's degree.

In all of the programs the first two years are given over to introductory work in fundamental subjects. The purpose is to enable the student to attain experience and breadth of view so that he may take a more intelligent part in his own further education. During the last two years the student pursues a major and a minor field of study and appropriate electives, with guidance from the head of his major department and from the Dean of the School of Arts and Sciences.

## MAJOR AND MINOR STUDIES

By April 15 of his sophomore year, the student selects a major and a minor field of study, according to the following directions:

1. One of the following subjects must be chosen as the field of major study: economics, English, history, journalism, mathematics, or modern languages.

2. For his minor study the student may select one of the above subjects other than that of his major study or one of the following: biology, business administration, chemistry, education, entomology, geography, geology and geophysics, government, health and physical education, meteorology, physics, psychology, or sociology.

3. The remainder of the elective work may be taken in any of the areas of study indicated above, or in other departments of the College, subject to the approval of the Dean of Arts and Sciences.

4. To satisfy the requirements for graduation, a student must complete not less than thirty semester hours in his major study, of which at least twelve hours are in advanced courses (above the sophomore level), and not less than eighteen semester hours in his minor study, of which at least six hours are in advanced courses. Upon recommendation of the head of the student's major department, the Dean may authorize the substitution of courses in closely related departments for a limited number of hours in the major or minor study.

## FOREIGN LANGUAGE REQUIREMENT

The student will satisfy the foreign language requirement by completing four semesters of study in one language.

## THE SOPHOMORE SCIENCE REQUIREMENT

A student whose curriculum includes a sophomore science requirement may satisfy this requirement in one of three ways:

1. Normally, he will schedule any two (one each semester) of the following survey courses: Chemistry 106, Geography 203, Geology 205, Physics 211.

2. Alternatively, he may substitute for the two survey courses any two-semester course in chemistry, geology, or physics.

3. By special permission of the Dean, he may be allowed to substitute the first semester of the usual two-semester introductory course in chemistry, geology, or physics for the survey course in that science. This last provision is intended to prevent unnecessary duplication in the program of students changing from one curriculum to another or transferring from another institution with science credit equivalent to an introductory rather than a survey course.

## Curricula in
## LIBERAL ARTS

### FRESHMAN YEAR

(For Majors in Economics, English, History, and Modern Languages)

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**[1]<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 107**[1]<br>Vertebrate Zoology | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**[3]<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[2] | (3-0) | 3 | **Modern Language**[2] | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 2 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 18 |

NOTES: 1. Transfers who have credit for any 6 hours of college biology may substitute such credit for Biology 101, 107.

2. See "The Foreign Language Requirement," page 141.

3. Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit in these curricula.

## For a Major in
## ECONOMICS

Most students who major in economics enter upon a business career following their graduation. These students obtain a broad foundation for such a career by combining a judicious selection of courses in business administration with those prescribed in their major program. Other students find it desirable to obtain an undergraduate degree with a major in economics before entering law school. Still others pursue the four-year course in preparation for graduate study leading to careers in teaching, research, or government service.

### FRESHMAN YEAR

(See above)

### SOPHOMORE YEAR[3]

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | **(3-3)** | **4** |
| **Economics 323**<br>Economic Analysis | **(3-0)** | **3** |
| **Psychology 207**<br>General Psychology<br>**Or** | **(3-0)** | |
| **Psychology 303**<br>Psychology for Technical Students | **(3-0)** | **3** |
| **Elective**[4-5] | | **7** |
| | | **17** |

| Second Semester | | Credit |
|---|---|---|
| **Economic History**[6] | **(3-0)** | **3** |
| **Economics 311**<br>Money and Banking | **(3-0)** | **3** |
| **Economics (elective)** | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Elective**[4-5] | | **5** |
| | | **17** |

## SENIOR YEAR

| | | |
|---|---|---|
| **Economics 410**<br>Theory of Income and Employment | **(3-0)** | **3** |
| **Economics (elective)** | **(3-0)** | **3** |
| **Economics (elective)** | **(3-0)** | **3** |
| **Elective** | | **8** |
| | | **17** |

| | | |
|---|---|---|
| **Economics (elective)** | **(3-0)** | **3** |
| **Economics (elective)** | **(3-0)** | **3** |
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Elective** | | **8** |
| | | **16** |

NOTES:
1. See "The Foreign Language Requirement," page 141.
2. See "The Sophomore Science Requirement," page 141.
3. The student planning his advanced course of study should consult with the Head of the Department sometime during the second semester of his sophomore year to make out his degree plan. There is available a suggested program of work for those who wish to combine a major in economics with Latin American studies.
4. Business Administration 304 or 418 can substitute for three semester hours of economics electives.
5. Junior and senior electives are to be selected after consultation with the student's major advisor.
6. Credit for Economics 319 (Economic Development of the United States) or Economics 320 (Economic Development of Europe) will satisfy this requirement.

## For a Major in
## ENGLISH

The curriculum for a major in English is designed for breadth in education. In the Department of English, the English major studies writing skills, the language, and literature. Outside of the Department of English, he studies physical and biological sciences, social sciences, foreign language, history, and philosophy. A large part of the program, especially in the junior and senior years, is left to the choice of the student. Through electives the student may extend his knowledge in the humanities, sciences, social sciences, or even technological skills. The curriculum for the English major, then, is suitable not only for the student who expects to continue his studies of the humanities in graduate school but also for the student who expects to go into business or to become a student of law or medicine or religion.

The student desiring both a full professional training and a broad general education may in five years complete the requirements for two degrees — Bachelor of Arts in English and Bachelor of Science in any one of the professional fields. For specific degree plans, which are made out for each individual entering this program, the student should consult the Dean of Arts and Sciences and the dean of any other school in which he seeks a professional degree. (For degrees in English and in Engineering, see page 176; in English and in other fields in Arts and Sciences, page 139.)

## FRESHMAN YEAR

(See page 142)

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 231**<br>Survey of English Literature | **(3-0)** | **3** | **English 212**<br>Shakespeare | **(3-0)** | **3** |
| **History 213**<br>History of England | **(3-0)** | **3** | **History 214**<br>History of England | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1] | **(3-0)** | **3** | **Modern Language**[1] | **(3-0)** | **3** |
| **Science**[2] | **(3-3)** | **4** | **Science**[2] | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**<br>The English Language<br>**Or** | **(3-0)** | | **English (elective)** | **(3-0)** | **3** |
| **English 310**<br>Phonetics and Pronunciation | **(3-0)** | **3** | **English 322**<br>Nineteenth Century Literature | **(3-0)** | **3** |
| **English 321**<br>Nineteenth Century Literature | **(3-0)** | **3** | **Elective** | | 12 |
| **Government 306**<br>American National Government | **(3-0)** | **3** | | | 18 |
| **Elective** | | 8 | | | |
| | | 17 | | | |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 407**<br>Speaking and Oral Interpretation | **(1-2)** | **2** | **English (elective)** | **(3-0)** | **3** |
| **English (elective)** | **(3-0)** | **3** | **Elective** | | 14 |
| **Elective** | | 12 | | | 17 |
| | | 17 | | | |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. See "The Sophomore Science Requirement," page 141.

## For a Major in HISTORY

Through a major in history a student may provide the basis for a broad liberal education, and at the same time find a useful vocation or avocation. History majors find employment opportunities in public school teaching, museum and archives work, state and national park service, diplomatic and consular service, public relations and public information offices, and in writing, research, and bibliographical work.

Many students find it desirable to obtain an undergraduate degree with a major in history and a minor in some related field such as economics, English, government, modern languages, or sociology before entering law school, seminary training, regular military service, and certain careers in industry and government.

The program in history provides excellent preparation for the further study of history beyond the baccalaureate degree.

## FRESHMAN YEAR

(See page 142)

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 212**<br>Shakespeare | **(3-0)** | **3** | **English 231 or 232**<br>Survey of English Literature | **(3-0)** | **3** |
| **History 217**<br>Development of Europe | **(3-0)** | **3** | **History 218**<br>Development of Europe | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1] | **(3-0)** | **3** | **Modern Language**[1] | **(3-0)** | **3** |
| **Science**[2] | **(3-3)** | **4** | **Science**[2] | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Government 306**<br>American National Government | **(3-0)** | **3** | **Government 307**<br>State and Local Government | **(3-0)** | **3** |
| **History (elective)** | | **6** | **History (elective)** | | **6** |
| **Elective** | | **8** | **Elective** | | **9** |
| | | 17 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** | **History (elective)** | | **3** |
| **History (elective)** | | **6** | **Elective** | | **14** |
| **Elective** | | **9** | | | 17 |
| | | 17 | | | |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. See "The Sophomore Science Requirement," page 141.

## For a Major in JOURNALISM

Programs for students majoring in journalism are designed to prepare them for futures in the communications field. By the beginning of the junior year, each student determines, with the advice of members of the Department, what special phase of journalism he wishes to emphasize in his own program—community newspapers, urban newspapers, news-editorial work, advertising, business management, industrial writing and editing, radio-TV journalism. A major in agricultural journalism is available for students interested primarily in the field of technical journalism, serving agriculture.

Upon completing the curriculum, most students enter either the news or advertising departments of newspapers or magazines. Other students find opportunities in the radio-television field and in public relations.

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees — the Bachelor of Science degree in a technical field such as Industrial Technology or the Bachelor of Business Administration in Personnel Administration concurrently with the Bachelor of Arts degree in Journalism. See page 139.

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | **(3-3)** | **4** | **English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **English 103**<br>Composition and Rhetoric | **(3-0)** | **3** | **History 106**<br>History of the United States | **(3-0)** | **3** |
| **History 105**<br>History of the United States | **(3-0)** | **3** | **Mathematics 110**<br>Survey Course in Mathematics | **(3-0)** | **3** |
| **Mathematics 102**<br>Algebra | **(3-0)** | **3** | **Military or Air Science** | **(0-3)** | **1** |
| **Military or Air Science** | **(0-3)** | **1** | **Modern Language**[1] | **(3-0)** | **3** |
| **Modern Language**[1] | **(3-0)** | **3** | **Science**[2] | **(3-3)** | **4** |
| **Physical Education 101** | **(0-2)** | **R** | **Elective** | | **1** |
| | | | **Physical Education 102** | **(0-2)** | **R** |
| | | **17** | | | 18 |

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Journalism 201**<br>News Writing | (2-3) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 232**<br>Survey of English Literature | (3-0) | 3 |
| **Journalism 202**<br>Beginning News Reporting | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Journalism 304**<br>Feature Story Writing | (2-2) | 3 |
| **Journalism 307**<br>News Editing | (2-3) | 3 |
| **Elective** | | 8 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 205**<br>Marketing<br>**Or** | (3-0) | |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English (elective)**[3] | | 3 |
| **Journalism 306**<br>Newspaper Production and Management | (2-2) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| **Elective** | | 4 |
| | | 16 |

## SUMMER WORK

Journalism 300; Summer Practice, ten weeks, required.

## SENIOR YEAR

| | | |
|---|---|---|
| **English (elective)**[3] | | 2 |
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Journalism 409**<br>History and Principles of Journalism | (3-0) | 3 |
| **Elective** | | 9 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 410**<br>Publications Editing and Designing | (1-3) | 2 |
| **Journalism 412**<br>Editorial Writing | (3-0) | 3 |
| **Journalism (elective)** | | 3 |
| **Elective** | | 7 |
| | | 17 |

NOTES:

1. See "The Foreign Language Requirement," page 141.
2. The student may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. It is recommended that the student select any one of the following: English 325, 328, 340, 350, 371, 375.
4. The Journalism Department has assembled information on the various areas of emphasis which will prove a valuable guide to a student planning his advanced course of study and choosing his electives at the beginning of the junior year.
5. The Journalism Department, in cooperation with the Texas Daily Newspaper Association, offers a 10-week professional internship program for selected students who have demonstrated superior ability. These internships are available only during the summer following the junior year.
6. For further information on agricultural journalism, see pages 111 and 131.

# For a Major in
# MATHEMATICS

## FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 101**<br>General Chemistry | **(3-3)** | **4** |
| **English 103**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **History 105**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 102**<br>Algebra | **(3-0)** | **3** |
| **Mathematics 103**<br>Plane Trigonometry | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physical Education 101** | **(0-2)** | **R** |
| | | **17** |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | **(3-3)** | **4** |
| **English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| **Mathematics 120**<br>Analytic Geometry and Calculus | **(5-0)** | **5** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Physics 218**<br>Mechanics and Heat | **(3-3)** | **4** |
| **Physical Education 102** | **(0-2)** | **R** |
| | | **17** |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 115**<br>Survey of Biology | **(3-3)** | **4** |
| **English 212**<br>Shakespeare | **(3-0)** | **3** |
| **Mathematics 210**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**<br>French, German, Russian, or Spanish | **(3-0)** | **3** |
| **Physics 219**<br>Sound, Light, Electricity | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **18** |

| | | |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | **(3-0)** | **3** |
| **History 106**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 307**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**<br>French, German, Russian, or Spanish | **(3-0)** | **3** |
| **Physics 220**<br>Modern Physics | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **17** |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Mathematics 308**<br>Differential Equations | **(3-0)** | **3** |
| **Modern Language**<br>French, German, Russian, or Spanish | **(3-0)** | **3** |
| **Elective** | | **5** |
| | | **17** |

| | | |
|---|---|---|
| **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **Mathematics (elective)** | | **6** |
| **Modern Language**<br>French, German, Russian, or Spanish | **(3-0)** | **3** |
| **Elective** | | **5** |
| | | **17** |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Mathematics (elective)** | | **3** |
| **Elective** | | **12** |
| | | **17** |

| | | |
|---|---|---|
| **Mathematics (elective)** | | **3** |
| **Elective** | | **14** |
| | | **17** |

NOTES: 1. The minor field of study should be chosen only after consultation with the Head of the Department of Mathematics, who will help the student arrange a program appropriate to his plans following graduation.

2. Students planning to enter the Graduate School should elect Mathematics 409 and 415.

## For a Major in
## MODERN LANGUAGES

### FRESHMAN YEAR

(See page 142 with Spanish required as the modern language.)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>Spanish | (3-0) | 3 | **Modern Language**[1]<br>Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 | **Science**[2] | (3-3) | 4 |
| **Elective** | | 3 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 309**[3]<br>The English Language | (3-0) | 3 | **English 310**[3]<br>Phonetics and Pronunciation | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Modern Language**<br>Spanish | (3-0) | 3 |
| **Modern Language**<br>Spanish | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Elective** | | 9 |
| **Elective** | | 5 | | | 18 |
| | | 17 | | | |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **History 314**[4]<br>The Latin-American Republics, 1820 to the Present | (3-0) | 3 |
| **History 313**[4]<br>The Latin-American Nations to 1820 | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Modern Language**<br>Spanish | | 2 |
| **Modern Language**<br>Spanish | | 2 | **Elective** | | 9 |
| **Elective** | | 7 | | | 17 |
| | | 17 | | | |

NOTES:

1. See "The Foreign Language Requirement," page 141. Students who take beginning Spanish in their freshman year must elect 6 hours of advanced Spanish in their senior year.
2. See "The Sophomore Science Requirement," page 141.
3. For those who do not expect to teach, a substitution in economics or history will be allowed upon approval by the Head of the Department of Modern Languages.
4. In case of unavoidable conflict with another required course, a substitution in the fields of history or economics will be allowed upon approval by the Head of the Department and the Dean of the School of Arts and Sciences.
5. Recommended electives: Advanced courses in economics, geography, or history.
6. For most students majoring in modern languages, economics, English, and history are logical minors.

## Studies Preparatory to
## LAW

Students who plan to obtain an undergraduate degree before undertaking the study of law will normally register for one of the regular degree programs. Particularly appropriate are the programs in business administration, economics, English, and history. Students who plan to complete no more than three years of undergraduate work before entering law school will matriculate in the three-year preparatory program listed below. Any student who completes this program may still earn a Bachelor of Arts degree with a major in history and a minor in economics by completing one additional year of course work as follows: 12 semester hours of history selected from History 302, 315, 318 (or 423 and 424), 331, 411, and 421; Economics 321, 324; English 403; and 16 hours of electives, including if possible Business Administration 303.

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 319**<br>Economic Development of the United States | (3-0) | 3 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1]<br>French, German, or Spanish | (3-0) | 3 |
| **Science**[2] | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **History 213**<br>History of England | (3-0) | 3 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Government 308**<br>United States Constitutional Development | (3-0) | 3 |
| **History 214**<br>History of England | (3-0) | 3 |
| **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **Elective** | | 3 |
| | | 18 |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. To satisfy the requirement in physical science, the student may choose one of the following: Chemistry 101, 102 or Physics 201, 202.

3. The American Bar Association minimum requirement for admission to an accredited law school is three years of acceptable college work. Students who plan to seek admission to a law school after completing the three-year program listed above are strongly advised to check the program with the registrar of the school of their choice before beginning the third year. If necessary to meet specific requirements, substitutions may be approved by the Dean of the School of Arts and Sciences.

Students planning to attend the Law School of the University of Texas must use the 6 semester hours of elective in the junior year for advanced courses (300-400 level) in economics, government, history, or sociology.

4. A student may qualify for the Bachelor of Arts degree from the Agricultural and Mechanical College of Texas by completing the three-year pre-law curriculum here and at least one year at an accredited law school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

## BUSINESS ADMINISTRATION

The several curricula in business administration provide training for business careers. The freshman year is the same in all curricula with the exception of building products marketing. A student who plans to major in building products marketing follows a separate course of study beginning with his freshman year. Other students elect a major field at the beginning of the sophomore year choosing one of the following: accounting, finance, general business, insurance, marketing, personnel administration.

Each curriculum contains courses essential to a general education and permits the study of fundamental business theory and procedure with limited specialization in one of the major fields. Upon the completion of his chosen curriculum, the student receives the degree of Bachelor of Business Administration.

## Curricula in BUSINESS ADMINISTRATION

(For Majors in Accounting, Finance, General Business, Insurance, Marketing, Personnel Administration)

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Mathematics 102**[1]<br>Algebra | (3-0) | 3 | **Science**[2] | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Elective** | | 3 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

NOTES: 1. Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the student's capabilities. Mathematics 101 does not carry degree credit in this curriculum.

2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.

## For a Major in ACCOUNTING

The curriculum in accounting offers a professional course of training for employment in commercial and industrial accounting, public accounting, or governmental accounting. Positions in these fields are generally designated as accountant, public accountant, certified public accountant, tax accountant, auditor, cost accountant, internal auditor, and controller. The basic business training obtained in this curriculum also qualifies graduates for employment eventually leading to executive positions in industry.

### FRESHMAN YEAR

(See page 150)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 16 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 327**<br>Intermediate Accounting | (2-3) | 3 | **Business Administration 328**<br>Intermediate Accounting | (2-3) | 3 |
| **Business Administration 329**<br>Elementary Cost Accounting | (3-0) | 3 | **Business Administration 332**<br>Cost Accounting | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 5 | **Elective** | | 5 |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 306**<br>Business Law | (3-0) | 3 | **Business Administration 402**<br>Accounting Systems | (2-0) | 2 |
| **Business Administration 330**<br>Advanced Accounting | (3-0) | 3 | **Business Administration 403**<br>Income Tax | (3-0) | 3 |
| **Business Administration 407**<br>Auditing | (3-0) | 3 | **Business Administration 406**<br>Managerial Accounting<br>**Or** | (3-0) | |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 408**<br>Auditing | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Elective** | | 10 |
| **Elective** | | 4 | | | |
| | | 18 | | | 18 |

## For a Major in
## BUILDING PRODUCTS MARKETING

The curriculum in building products marketing was developed in cooperation with the retail building materials industry, the Lumberman's Association of Texas, and the National Retail Lumber Dealers Association. It is designed to train persons who plan to seek employment in the building materials industry. The curriculum provides an educational foundation for responsible positions in this industry.

### FRESHMAN YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 105**<br>Introduction to Business | (3-0) | 3 | **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 16 | | | 16 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102 according to the student's capabilities. Mathematics 101 does not carry degree credit in this curriculum.

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agricultural Engineering 205**<br>Materials in Light Structures | (2-3) | 3 | **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 216**<br>Building Products | (0-2) | 1 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Engineering Graphics 221**<br>Building Construction Drawing | (1-3) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Physics 211**<br>A Brief Survey of Physics | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 329**<br>Elementary Cost Accounting | (3-0) | 3 | **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 4 |
| **Elective** | | 4 | | | 17 |
| | | 17 | | | |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 315**<br>Insurance | **(3-0)** | **3** | **Business Administration 418**<br>Corporation Finance | **(3-0)** | **3** |
| **Business Administration 435**<br>Salesmanship | **(3-0)** | **3** | **Business Administration 422**<br>Personnel Problems of Industry | **(3-0)** | **3** |
| **Business Administration 461**<br>Retailing Building Products | **(2-0)** | **2** | **Business Administration 428**<br>Real Estate Titles<br>and Conveyances | **(3-0)** | **3** |
| **Civil Engineering 473**<br>Cost Estimating | **(3-0)** | **3** | **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Psychology 303**<br>Psychology for Technical Students | **(3-0)** | **3** | **Elective** | | **7** |
| **Elective** | | **4** | | | |
| | | 18 | | | 18 |

NOTE: A minimum of 12 weeks of practice in the industry is required. This practice is to be approved in advance, and suitable reports are to be submitted on each assignment.

## For a Major in
## FINANCE

The curriculum in finance provides instruction in the principles and institutions of finance with training in the techniques and practices of financial management. The courses in accounting, economics, business law, and elective fields provide a balanced background for careers in finance.

An objective of the program is to prepare students for managerial positions in such fields of business finance as commercial banking, investment banking, securities brokerage, trust management, and property management. The program also provides training for employment with governmental agencies engaged in lending operations and regulation of securities markets.

## FRESHMAN YEAR
(See page 150)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | **(3-0)** | **3** | **Business Administration 228**<br>Principles of Accounting | **(3-3)** | **4** |
| **Business Administration 227**<br>Principles of Accounting | **(3-3)** | **4** | **Business Administration 306**<br>Business Law | **(3-0)** | **3** |
| **Business Administration 305**<br>Business Law | **(3-0)** | **3** | **Business Administration 315**<br>Insurance | **(3-0)** | **3** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** | **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Elective** | | **1** | **Elective** | | **1** |
| **Physical Education 201** | **(0-2)** | **R** | **Physical Education 202** | **(0-2)** | **R** |
| | | **17** | | | **17** |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | **(3-3)** | **4** | **Business Administration 304**<br>Business Cycles and<br>Business Measurements | **(3-0)** | **3** |
| **Business Administration 327**<br>Intermediate Accounting | **(2-3)** | **3** | **Business Administration 310**<br>Credits and Collections | **(2-0)** | **2** |
| **Economics 311**<br>Money and Banking | **(3-0)** | **3** | **Business Administration 418**<br>Corporation Finance | **(3-0)** | **3** |
| **English 301**<br>Writing for Professional Men | **(3-0)** | **3** | **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Elective** | | **4** | **Elective** | | **6** |
| | | **17** | | | **17** |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 308**<br>Law of Private Corporations | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 6 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 432**<br>Security Analysis | (3-0) | 3 |
| **Business Administration 434**<br>Problems in Finance | (3-0) | 3 |
| **Economics 412**<br>Public Finance | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## For A Major in GENERAL BUSINESS

Students who do not wish to major in one of the several special fields in business administration may follow the curriculum in general business. This curriculum includes one or more courses in each of the fields of business administration and thereby provides a broad training for business careers. It is designed for those planning to establish their own business or preparing for employment eventually leading to responsible positions in industry.

## FRESHMAN YEAR

(See page 150)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Elective** | | 1 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 |
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 315**<br>Insurance | **(3-0)** | **3** | **Business Administration 420**<br>Principles of Investment | **(3-0)** | **3** |
| **Business Administration 325**<br>Retailing | **(3-0)** | **3** | **Business Administration 422**<br>Personnel Problems of Industry | **(3-0)** | **3** |
| **Business Administration 418**<br>Corporation Finance | **(3-0)** | **3** | **Business Administration 435**<br>Salesmanship | **(3-0)** | **3** |
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** | **Elective** | | **9** |
| **Elective** | | **6** | | | 18 |
| | | 17 | | | |

### For A Major in INSURANCE

The insurance industry is seeking an increasing number of college graduates for positions as agents, agency managers, underwriters, claim adjusters, payroll auditors, safety engineers, and executives. The insurance field includes life, property, and casualty insurance, and corporate suretyship. The curriculum in insurance is designed to provide the training for students who plan to enter this field, whether on their own account, with insurance companies, or with business or industrial concerns.

## FRESHMAN YEAR

(See page 150)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | **(3-0)** | **3** | **Business Administration 228**<br>Principles of Accounting | **(3-3)** | **4** |
| **Business Administration 227**<br>Principles of Accounting | **(3-3)** | **4** | **Business Administration 315**<br>Insurance | **(3-0)** | **3** |
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** | **Economics 204**<br>Principles of Economics | **(3-0)** | **3** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** | **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Psychology 303**<br>Psychology for Technical Students | **(3-0)** | **3** | **Elective** | | **4** |
| **Elective** | | **1** | **Physical Education 202** | **(0-2)** | **R** |
| **Physical Education 201** | **(0-2)** | **R** | | | 17 |
| | | 17 | | | |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 303**<br>Statistical Method | **(3-3)** | **4** | **Business Administration 304**<br>Business Cycles and<br>Business Measurements | **(3-0)** | **3** |
| **Business Administration 305**<br>Business Law | **(3-0)** | **3** | **Business Administration 306**<br>Business Law | **(3-0)** | **3** |
| **Business Administration 322**<br>Property Insurance | **(3-0)** | **3** | **Business Administration 320**<br>Life Insurance | **(3-0)** | **3** |
| **Economics 311**<br>Money and Banking | **(3-0)** | **3** | **English 301**<br>Writing for Professional Men | **(3-0)** | **3** |
| **Elective** | | **3** | **Elective** | | **6** |
| | | 16 | | | 18 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 324**<br>Casualty Insurance<br>and Suretyship | (3-0) | |
| **Or** | | |
| **Business Administration 437**<br>Applied Life Insurance | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 440**<br>Real Estate Fundamentals | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 427**<br>Insurance Law | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## For A Major in MARKETING

The field of marketing is diversified in the scope of its opportunities. Typical of the fields in which expansion is taking place is retail merchandising. Its major departments include store management, buying, publicity, merchandise planning, research, and personnel work. Market research will make increased demands upon those able to furnish management with the data necessary to keep abreast of marketing changes, to eliminate wasteful marketing methods, and to develop new products. The field of sales administration requires an ever-increasing number of individuals qualified to recruit, select, and train selling personnel. Also in this area lie the important functions of establishing sales territories, setting sales quotas, and sales costing. Personal selling is a field offering many opportunities for employment. In the field of advertising a student may gain added proficiency by electing advertising courses taught in the Department of Journalism.

By careful selection of electives, a student can specialize in one of the different fields of marketing or gain general knowledge in anticipation of starting his own business.

## FRESHMAN YEAR

(See page 150)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Geography 204**<br>Economic Geography | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R |
| | | **16** |

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 202** | (0-2) | R |
| | | **17** |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Business Administration 206**<br>Purchasing and Control of Materials | (2-0) | 2 | **Business Administration 304**<br>Business Cycles and Business Measurements | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **Business Administration 325**<br>Retailing | (3-0) | 3 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 | **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 4 | | | |
| | | 18 | | | 18 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 | **Business Administration 344**<br>Marketing Problems | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 | **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Business Administration 445**<br>Marketing Research | (3-0) | 3 | **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 6 | **Elective** | | 5 |
| | | 17 | | | 17 |

NOTE: Six hours of electives are to be selected from the following:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 310**<br>Credits and Collections | (2-0) | 2 | **Business Administration 456**<br>Applied Salesmanship | (0-2) | 1 |
| **Business Administration 318**<br>Wholesale Merchandising | (3-0) | 3 | **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 | **Sociology 311**<br>Social Psychology | (3-0) | 3 |
| **Business Administration 447**<br>Advertising Procedures | (3-0) | 3 | | | |

## For a Major in
## PERSONNEL ADMINISTRATION

The curriculum in personnel administration provides training for employment in the personnel departments of industrial concerns, public institutions, and governmental agencies, especially those agencies concerned with employer — employee relations. In recent years employer — employee relations have become a major problem of business and society, with the result that there is an increasing demand for qualified college graduates to work in this important field.

## FRESHMAN YEAR
(See page 150)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 228**<br>Principles of Accounting | (3-3) | 4 |
| **Business Administration 227**<br>Principles of Accounting | (3-3) | 4 | **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 | **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 16 |
| | | 18 | | | |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 306**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 422**<br>Personnel Problems of Industry | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Business Administration 423**<br>Personnel Policies and Techniques | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Economics 435**<br>Economics of Collective Bargaining | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Economics 437**<br>Government and Labor Relations | (2-0) | 2 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Elective** | | 9 |
| | | 17 |

## Curriculum in
## PSYCHOLOGY

The degree program in psychology provides the necessary background for subsequent professional training at the graduate level, especially in the fields of industrial and experimental psychology. Alternately, it offers a broad scientific base for on-the-job training in the armed services or in industry.

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**[1]<br>College Physics | (3-3) | 4 |
| **Psychology 207**[2]<br>General Psychology | (3-0) | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 204**<br>Principles of Economics | (3-0) | 3 |
| **English (Literature elective)** | | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**[1]<br>College Physics | (3-3) | 4 |
| **Psychology (Elective)** | | 3 |
| **Elective** | | 3 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Economics 318**<br>Economics of Labor | (3-0) | 3 | **Education 439**[3]<br>Educational Statistics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Psychology 406**<br>Psychology of Learning | (3-0) | 3 |
| **Psychology 309**<br>Differential Psychology | (3-0) | 3 | **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 | **Elective** | | 8 |
| **Elective** | | 6 | | | |
| | | 18 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 | **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Psychology 403**<br>Dynamics of Human Behavior | (3-0) | 3 | **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |
| **Sociology 311**[3]<br>Social Psychology | (3-0) | 3 | **Psychology 408**<br>Experimental Psychology | (2-3) | 3 |
| **Elective** | | 8 | **Psychology (Elective)** | | 3 |
| | | | **Elective** | | 5 |
| | | 17 | | | 17 |

NOTES: 1. The following substitutions for Physics 201 and 202 may be made with the approval of the student's advisors: 8 additional hours of chemistry; or 6 additional hours of zoology involving laboratory credit, plus 2 hours of elective; or Genetics 301 and 4 hours in physics.

2. Psychology 303 may be substituted for Psychology 207.

3. Education 439 and Sociology 311 will count as hours in psychology.

## PREPARATION FOR TEACHING

### EDUCATION AND PSYCHOLOGY

The Department of Education and Psychology offers teacher education programs for teaching in secondary schools leading to the degree of Bachelor of Arts or Bachelor of Science. The degree of Bachelor of Arts will require 12 hours of modern language. Students desiring to teach in the public schools may choose to major either in the Department of Education and Psychology or in a subject-matter area such as biology or mathematics.

Candidates preparing for work in the teacher education fields should select their courses under the guidance of the departmental advisor. Students beginning their teacher education program after September 1, 1955, will be eligible to receive the provisional certificate upon completing the requirements for the Bachelor's degree and being recommended by the Department to the Texas Education Agency. The Department of Education and Psychology also offers advanced undergraduate and graduate courses in preparation for certification at the professional level as master teachers, visiting teachers, counselors, supervisors, principals, and superintendents.

Students majoring in the Department of Education and Psychology or working toward the provisional or the professional certificate will be assigned an advisor who will counsel with the student during his teacher education program. Majors in the Department of Education and Psychology will follow the program outline on pages 160-162. Students majoring in subject-matter departments and working toward a provisional certificate must meet the following minimum requirements: (1) 6 semester hours of pre-professional work in education and psychology, (2) 12 semester hours of professional work in education and psychology, (3) 6 semester hours in supervised teaching, (4) 42 to 48 semester hours in teaching areas or fields of specialization, (5) not less than 45 semester hours of general education, and (6) the completion of requirements for the Bachelor's degree. To meet the requirements for the professional certificate, the student must have at least three years of teaching experience and must have completed an approved program of at least 30 semester hours of graduate work beyond the Bachelor's degree requirements.

## PREPARATION FOR TEACHING WITH A MAJOR IN EDUCATION

| | | |
|---|---|---|
| I. General Education | | 60 hours |
| Biological Science | 6 hours | |
| Economics | 3 hours | |
| English | 13 hours | |
| General Psychology | 3 hours | |
| Government | 6 hours | |
| History | 6 hours | |
| Mathematics | 6 hours | |
| Physical Education | 6 hours | |
| Physical Science | 8 hours | |
| Sociology | 3 hours | |

II. Plans of Specialization

Plan 1. The student must complete at least 24 hours of concentration in a subject-matter area identified with a field of teaching in the secondary schools and a minimum of 18 semester hours in a second subject-matter area. Teaching majors and minors may be selected from the following: biology, chemistry, English, history, journalism, mathematics, modern language, physics. A teaching minor is available in business administration. The exact courses involved will be chosen with the guidance of the student's advisor and the approval of the head of the department concerned.

Plan 2. The student may complete at least 48 hours of concentration in social studies or natural sciences.

| | | |
|---|---|---|
| III. Pre-Professional Education | | 6 hours |
| Introductory Education | 3 hours | |
| Educational Psychology | 3 hours | |
| IV. Professional Education | | 12 hours |
| Secondary School Methods | 3 hours | |
| Adolescent Psychology | 3 hours | |
| History and Philosophy of Secondary Education | 3 hours | |
| Secondary School Curriculum | 3 hours | |
| V. Professional Laboratory Experiences | | 6 hours |

Professional laboratory experiences consist of actual and direct contacts with youth in school, home, and community. They include observations made in connection with courses in psychology, instructional methods, and curriculum and testing. They also include participation in teaching activities during which the student accepts the direct responsibility for the success of a group of youth in a school situation. This experience will be given during the student's senior year upon the completion of the pre-professional and professional requirements in the teacher education program and satisfactory progress in the plan of specialization. Application for enrollment in supervised teaching must be made upon the recommendation of the student's advisor.

VI. Professional Electives ........ 6 hours

The student will be required to take 6 hours of professional work in the field of education or psychology or the equivalent upon the recommendation and approval of the student's advisor. These experiences will be directed toward meeting the need of students preparing for special areas of work.

VII. Electives

Electives to satisfy the requirements of a teacher education program to make a total of 137 semester hours. These hours will be chosen with the consent of the advisor.

## Curriculum in EDUCATION

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**[1]<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry<br>Or | (3-0) | |
| **Mathematics 110**<br>Survey Course in Mathematics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 203**<br>Introduction to Literature<br>Or | (2-0) | |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Elective** | | 8 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English (elective)** | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 7 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Education 321**<br>Secondary School Methods | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

| | | |
|---|---|---|
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Sociology 206**<br>Social Institutions and Processes | (3-0) | 3 |
| **Elective** | | 9 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Education 421**<br>History and Philosophy of Education | (3-0) | 3 | **Education 425**<br>Supervised Student Teaching | (2-12) | 6 |
| **Education 444**<br>Secondary School Curriculum | (3-0) | 3 | **Education (elective)** | | 3 |
| **Education (elective)** | | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 | **Elective** | | 3 |
| **Elective** | | 6 | | | |
| | | 18 | | | 14 |

NOTES:

1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the student's capabilities in mathematics. Mathematics 101 does not carry degree credit in this curriculum.
2. With the consent of the student's advisor, the following substitutions may be made in the program outlined above:
   (1) Biological Sciences. A minimum of 6 hours of biological science is required. For Biology 101 and 107, students may substitute Biology 115 (3-3) and Biology 330 (2-0) or Biology 337 (2-0).
   (2) Physical Science. A minimum of 8 hours of physical science is required. For Chemistry 101 and 102, students may substitute Physics 201 (3-3) and 202 (3-3), or select 8 hours from these courses: Chemistry 106 (3-3), Physics 211 (3-3), Geology 205 (3-3), and Geography 203 (3-3).
   (3) Education 121. A student entering upon a certificate or degree program with junior or senior classification may substitute a more advanced course in education for Education 121.
   (4) Physical Education 213, Health Education 415. A student may substitute approved courses in his teaching major or minor for Physical Education 213 and/or Health Education 415.
3. The English elective in the sophomore year should be chosen from literature courses. Students planning to teach English in the secondary schools may substitute for English 203 or 210 a 3-hour English course chosen with the consent of the advisor. If a student writes unsatisfactorily, he may be required to take an additional course in writing, such as English 301.
4. In choosing electives, the student should keep in mind the requirements of his subject-matter area of teaching specialization.

## HEALTH AND PHYSICAL EDUCATION

The Department of Health and Physical Education offers a major for the student interested in a career as a: (1) physical education teacher in secondary or elementary schools; (2) athletic coach of an interschool sport; (3) athletic trainer; or (4) corrective therapist. The Bachelor's degree is granted students who complete the prescribed program of studies in professional education, physical education, and general education, and establish a teaching minor in one of the usual secondary school subject matter fields. The choice of a teaching minor may be made only with the approval of the Head of the Department of Health and Physical Education.

Upon completion of the prescribed curriculum and recommendation to the Texas Education Agency, the student will be eligible for (1) the All-Grade Level Certificate in Health and Physical Education and (2) Secondary School Certificate.

### Corrective Therapy

This program is offered in cooperation with the Veterans Administration to prepare specialists in rehabilitation through corrective therapy. This program includes a six-week clinical training period at the Veterans Administration Hospital in Houston. Graduates of this program may be employed by the Veterans Administration, private hospitals, or other organizations concerned with physical rehabilitation.

## Curriculum in
## PHYSICAL EDUCATION

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematcs 102**[1]<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **Physical Education 101** | (0-2) | R |
| | | 16 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Science**[2] | (3-3) | 4 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 219**<br>Mammalian Anatomy | (2-3) | 3 |
| **Biology 225**<br>Personal and Public Health | (2-0) | 2 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 211**<br>Physical Education Activities | (1-3) | 2 |
| **Physical Education 213**<br>Introduction to Health and Physical Education | (3-0) | 3 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Biology 220**<br>Physiology and Hygiene | (2-3) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |
| **Physical Education 325**<br>Outdoor Activities | (2-0) | 2 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Health Education 415**<br>Secondary School Health Education | (3-0) | 3 |
| **Physical Education 316**<br>Secondary School Physical Education | (3-0) | 3 |
| **Physical Education 427**<br>Remedial Exercises | (3-0) | 3 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 6 |
| | | 18 |

| | | |
|---|---|---|
| **Health Education 218**<br>Athletic Injuries | (1-3) | 2 |
| **Health Education 421**<br>Elementary School Health Education | (3-0) | 3 |
| **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Psychology 307**<br>Child Growth and Development | (3-0) | 3 |
| **Elective** | | 6 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Education (elective)**[3] | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Elective** | | 10 |
| | | 18 |

| | | |
|---|---|---|
| **Physical Education 423**<br>Administration of Health and Physical Education | (3-0) | 3 |
| **Physical Education 425**<br>Tests and Measurements | (3-0) | 3 |
| **Physical Education 450**<br>Directed Teaching | (2-12) | 6 |
| **Elective** | | 3 |
| | | 15 |

NOTES:

1. Mathematics 101 may be required as a prerequisite to Mathematics 102, depending upon the student's capabilities in mathematics. Mathematics 101 does not carry degree credit in this curriculum.
2. Students may select any one of the following: Chemistry 106, Geography 203, Geology 205, Physics 211.
3. Electives in Education may be chosen from any one of the following: Education 421, 427, 437.
4. History 325, 326 may be substituted for History 105, 106.

## SCIENCE

Science programs in the School of Arts and Sciences are administered by the following departments: Biology, Chemistry, Oceanography and Meteorology, and Physics.

The several curricula in science are planned for those students whose interests and abilities lie in the direction of seeking scientific truths and relations previously unknown or not understood in the world about us and of bringing these truths to bear on problems affecting the well-being of mankind. Because many students do not discover the nature of their interests or abilities until they have followed a curriculum in agriculture or engineering for a year or more, the curricula in science are so arranged that a student may change to science with a minimum of loss in semester hour credit.

The curricula are designed to serve the following purposes:

1. To prepare students for research in basic science, usually after further study at the graduate level.
2. To prepare teachers of science in secondary schools and other institutions of learning.
3. To provide the necessary undergraduate foundation for students planning to study medicine or kindred fields.
4. To afford a broad scientific training for students who desire it before entering some field of applied science in industry or government service.

## Curricula in BIOLOGICAL SCIENCES

### FRESHMAN YEAR

(For Majors in Botany, Entomology, Microbiology, and Zoology)

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 | **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Elective** | | 1 |
| | | | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 18 |

NOTE: Mathematics 101 may be required as a prerequisite to Mathematics 102, according to the capabilities of the student. Mathematics 101 does not carry degree credit in this curriculum.

## For a Major in BOTANY

### FRESHMAN YEAR

(See above)

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Biology 327**<br>Fundamental Plant Morphology | (2-3) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Geography 203**<br>Physical Geography | (3-3) | 4 | **Modern Language**<br>French or German | (3-0) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 | **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 453**<br>Plant Anatomy | (2-3) | 3 | **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 | **Biology (Botany elective)** | | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Modern Language**<br>French or German | (3-0) | 3 | **Modern Language**<br>French or German | (3-0) | 3 |
| **Elective** | | 4 | **Elective** | | 5 |
| | | 17 | | | 17 |

## For a Major in ENTOMOLOGY

## FRESHMAN YEAR
(See page 164)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 3 |
| | | 16 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 2 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Entomology 401**<br>Principles of Insect Control | (2-3) | 3 |
| **Entomology 423**<br>Comparative Anatomy of Arthropods | (2-3) | 3 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 |
| **Elective** | | 6 |
| | | 17 |

| | | |
|---|---|---|
| **Entomology 402**<br>General Economic Entomology | (2-3) | 3 |
| **Entomology 424**<br>Insect Ecology | (2-3) | 3 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 4 |
| | | 17 |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. Science electives should usually be selected from the following courses:

| | | |
|---|---|---|
| **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Biology 433**<br>General Physiology | (3-3) | 4 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 |
| **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Plant Physiology and Pathology 313**<br>Introduction to Plant Physiology | (2-3) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |

## For a Major in MICROBIOLOGY

## FRESHMAN YEAR

(See page 164)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology (Microbiology elective)**[1] | | 4 | **Biology (Microbiology elective)**[1] | | 4 |
| **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Liberal Arts**[2] | | 3 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 | **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 | **Biology (Microbiology elective)**[1] | | 4 |
| **Biology (Microbiology elective)**[1] | | 4 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Modern Language**<br>French, German, or Russian | (3-0) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Elective** | | 3 | **Modern Language**<br>French, German, or Russian | (3-0) | 3 |
| | | 16 | **Elective** | | 3 |
| | | | | | 17 |

NOTES:

1. Microbiology electives may be satisfied by Biochemistry and Nutrition 430; Biology 327, 353, 433, 438, 457, 608, 630, 647; Dairy Science 320, 326; Genetics 406; Plant Physiology and Pathology 314. Selections should be made with the aid of the student's advisor.
2. Liberal Arts elective may be satisfied by Liberal Arts 301, 304, or 201 and 311.
3. A program combining the basic requirements for a Bachelor of Science degree in microbiology with pre-medical requirements is available from the Chairman of the College Premedical Committee in the Department of Biology (See page 169).

## For a Major in ZOOLOGY

## FRESHMAN YEAR

(See page 164)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 17 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (Zoology elective)** | | 3 | **Biology (Zoology elective)** | | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Genetics 301**<br>Genetics | (3-2) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Modern Language**[1] | (3-0) | 3 | **Modern Language**[1] | (3-0) | 3 |
| **Elective** | | 3 | **Elective** | | 4 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Elective** | | 7 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology (Zoology elective)** | | 4 |
| **Elective** | | 12 |
| | | 17 |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. The elective hours in Zoology must include 12 hours chosen from the following courses: Biology 343, 344, 422, 433, 434, 435, 436.

3. Elective hours and the remaining hours required for the major should be selected from the following:

| | | |
|---|---|---|
| ***Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| ***Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 |
| **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Entomology 301**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 302**<br>Systematic Entomology | (2-3) | 3 |
| **Entomology 305**<br>Insect Morphology | (2-3) | 3 |
| **Entomology 306**<br>Insect Physiology | (2-3) | 3 |
| **Genetics 304**<br>Plant Breeding | (3-2) | 4 |
| **Genetics 306**<br>Animal Breeding | (2-2) | 3 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Wildlife Management 201**<br>Wildlife Conservation and Management | (3-0) | 3 |
| **Wildlife Management 311**<br>Ichthyology | (2-3) | 3 |
| **Wildlife Management 315**<br>Herpetology | (2-2) | 3 |
| **Wildlife Management 401**<br>General Mammalogy | (2-2) | 3 |
| **Wildlife Management 402**<br>General Ornithology | (2-2) | 3 |
| **Wildlife Management 403**<br>Animal Ecology | (2-3) | 3 |

## Studies Preparatory to
## MEDICINE, DENTISTRY, AND RELATED FIELDS
### Premedical and Predental Program

Students planning to enter a school of medicine or dentistry without first taking a college degree should matriculate in the curriculum in science and take the following program:

## FRESHMAN YEAR

| | | |
|---|---|---|
| **Biology 107**<br>Vertebrate Zoology | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| | | |
|---|---|---|
| **Biology 108**<br>Invertebrate Zoology | (2-3) | 3 |
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Elective** | | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

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*Strongly recommended for all zoology majors.

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biology 217**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 | **Biology 218**<br>Comparative Anatomy of Vertebrates | (2-4) | 3 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **English 212**<br>Shakespeare | (3-0) | 3 | **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 18 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology (elective)** | | 3 | **Biology (elective)** | | 3 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 342**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Government 307**<br>State and Local Government | (3-0) | 3 |
| **Modern Language** | (3-0) | 3 | **Modern Language** | (3-0) | 3 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 | **Elective** | | 4 |
| | | 19 | | | 19 |

NOTES: 1. Most students admitted to medical and dental schools in the United States have three or more years of pre-professional training. A large proportion hold college degrees. It is therefore recommended that students preparing to enter medical or dental schools plan to complete at least the foregoing three-year program.

2. Four years of college work with the receipt of the baccalaureate degree is the preferred preparation for medical and dental schools. Majors may be obtained in zoology (see page 167) or chemistry (see page 170), and also in physics, microbiology, history, English, and other subjects so long as the requirements for entrance to the professional school are satisfied.

3. A student may qualify for the Bachelor of Science degree from the Agricultural and Mechanical College of Texas by completing the three-year premedical curriculum here and at least one year at a Class A medical school or dental school, with a minimum of 137 acceptable semester hours, subject to the usual grade point requirement.

4. Since courses in literature, language, history, and social sciences are not offered in medical or dental schools, leaders in medical education urge prospective medical and dental students to include much of such work in their preprofessional education. Some electives for the junior and senior years in line with this recommendation are:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Liberal Arts 301**<br>Introduction to Philosophy | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Liberal Arts 304**<br>Philosophies of Life | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Sociology 205**<br>Principles of Sociology | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 | | | |

Electives available in the sciences related to medicine are:

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Biochemistry and Nutrition 410**<br>Introductory Biochemistry | (3-3) | 4 | **Biology 436**<br>Animal Parasitology | (3-3) | 4 |
| **Biology 206**<br>Introductory Microbiology | (2-4) | 3 | **Biology 457**<br>Bacterial Ecology | (2-6) | 4 |
| **Biology 343**<br>Histology | (2-3) | 3 | **Biology 481**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 344**<br>Embryology | (2-3) | 3 | **Biology 482**<br>Seminar in Biology | (1-0) | 1 |
| **Biology 422**<br>Microtechnique | (1-6) | 3 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Biology 433**<br>General Physiology | (3-3) | 4 | **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Biology 434**<br>Circulatory and Nerve Physiology | (2-3) | 3 | **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Biology 435**<br>Advanced Invertebrate Zoology | (3-3) | 4 | **Physics 310**<br>Applications of Modern Physics | (2-2) | 3 |

## Curricula in
## PHYSICAL SCIENCES

### (For Majors in Chemistry, Meteorology, and Physics)

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 17 |
| | | 17 | | | |

## For a Major in
## CHEMISTRY

### For classes graduating in 1962-63 and thereafter

### FRESHMAN YEAR
(See above)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 115**<br>Survey of Biology | (3-3) | 4 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Chemistry 226**<br>Chemical Calculations | (2-0) | 2 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 18 | | | 17 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 380**<br>Chemical Bibliography | (1-0) | 1 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Elective** | | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| | | | **Elective** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Analysis | (2-6) | 4 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 6 |
| **Elective** | | 2 | | | 16 |
| | | 18 | | | |

### For the class graduating in 1961-62

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 447**<br>Qualitative Organic Chemistry | (2-6) | 4 | **Chemistry 463**<br>Inorganic Chemistry | (2-3) | 3 |
| **Chemistry 461**<br>Physical Chemistry | (3-0) | 3 | **Chemistry 481**<br>Seminar | (1-0) | 1 |
| **Chemistry 462**<br>Inorganic Chemistry | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Modern Language**[1]<br>French or German | (3-0) | 3 |
| **Modern Language**[1]<br>French or German | (3-0) | 3 | **Elective** | | 7 |
| **Elective** | | 2 | | | 17 |
| | | 18 | | | |

NOTES: 1. See "The Foreign Language Requirement," page 141.

2. A program combining the basic requirements for a Bachelor of Science degree in Chemistry with premedical requirements is available. Students completing this four-year program will receive a degree certified by the Americal Chemical Society and at the same time satisfy all the premedical requirements. Mimeographed copies of this program are available at the Department of Chemistry and from the Chairman of the College Premedical Committee in the Department of Biology.

## For a Major in METEOROLOGY

Meteorology is the science of planetary atmospheres and their phenomena. Within the broad field of geophysics, it is concerned with physical and chemical processes and states within the earth's atmosphere and at the earth's surface. The objective of terrestrial meteorology is to determine the natural and physiochemical controls of the atmosphere and to apply this knowledge in various ways benefiting life and human endeavor.

Weather and climate through the ages have shaped the physical and biological features of the earth and have guided the course of human activities. However, it is only through quite recent, and continuing, developments in technology, communications, and transportation that sufficient information has been obtained about the atmosphere to enable meteorology to emerge as a separate college study. While satisfying public interest in the weather has been the major object in meteorology, the last few years have witnessed rapidly expanding applications in agriculture, engineering, industry, business, commerce, space exploration and travel, and national defense.

## FRESHMAN YEAR

(See page 170)

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| **Elective** | | 1 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Biology 330**<br>Life Science | (2-0) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Modern Language** | (3-0) | 3 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Biology 337**<br>Organic Evolution | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Meteorology 317**<br>Meteorological Instruments, Observations, and Communications | (2-3) | 3 |
| **Meteorology 325**<br>Physical Climatology | (3-0) | 3 |
| **Meteorology 335**<br>Atmospheric Statics and Thermodynamics | (3-0) | 3 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Meteorology 318**<br>Meteorological Instruments, Observations, and Communications | (1-3) | 2 |
| **Meteorology 326**<br>Regional Climatology | (2-0) | 2 |
| **Meteorology 336**<br>Atmospheric Motions | (3-3) | 4 |
| **Technical Elective** | | 3 |
| **Elective** | | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Meteorology 445**<br>Atmospheric Physical Processes | (3-0) | 3 |
| **Meteorology 457**<br>Fundamentals of Weather Analysis | (1-12) | 5 |
| **Elective** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Meteorology 458**<br>Weather Analysis | (1-12) | 5 |
| **Oceanography 401**<br>Introduction to Oceanography | (3-0) | 3 |
| **Technical Elective** | | 4 |
| **Elective** | | 3 |
| | | 17 |

## Technical Electives for METEOROLOGY

| | | |
|---|---|---|
| **Geography 203**<br>Physical Geography | (3-3) | 4 |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Physics 317**<br>Celestial Mechanics | (4-0) | 4 |
| **Physics 405**<br>Physical Mechanics | (3-0) | 3 |
| **Physics 418**<br>Theoretical Physics | (3-0) | 3 |

## OCEANOGRAPHY

Oceanography is the study of the oceans and their boundaries. It is based upon the unity of the sciences of the sea. Effective study of the subject requires thorough previous training in one of the pertinent basic sciences such as biology, chemistry, geology, mathematics, meteorology, and physics, or in engineering. Therefore, much of the work in oceanography is conducted at the graduate level, and the undergraduate program of students who wish to study oceanography must be planned to satisfy certain prerequisite requirements. It is suggested that such students consult regularly during their undergraduate years with the oceanography staff.

Five options, the biological, chemical, geological, physical, and meteorological with their corresponding engineering phases, are offered. The options require different undergraduate programs. These programs are taken in other departments except in the case of meteorological oceanography, where a complete undergraduate program in meteorology is offered in the Oceanography and Meteorology Department.

In the graduate program there are curricula leading to the Master of Science and Doctor of Philosophy degrees in each of the five options in oceanography. Specific prerequisite requirements are set up for each curriculum. In general, these consist of the courses normally required for the degree of Bachelor of Science in one of the basic fields listed above and some course work in each of the other fields.

Oceanography may be utilized in solving certain problems arising in fisheries work, offshore oil and gas operations, navigation, prevention of beach erosion, weather forecasting, recreation, extraction of raw materials from the sea, marine construction, coastal sanitation, military operations, fresh water supply, and many other activities. It requires broad interests, numerous skills, a real liking for the sea, and an adaptability to shipboard life.

### For a Major in
## PHYSICS

Physics is the science of energy and the interaction of energy and matter. Some physicists are primarily concerned with the discovery and investigation of effects and relations in the physical universe previously unknown or not understood. Others, known as applied physicists, are interested in bringing to the solution of industrial and technical problems, physical effects not previously so applied. When new and better ways are required to obtain and transmit energy or to alter the configuration or constitution of matter, physicists are of service.

Many branches of industry are seeking applied physicists with all levels of professional training from the Bachelor's to the Doctor's degree. Industrial and government-operated research laboratories and colleges and universities are seeking investigators of new physical truths and relations, with professional training beyond the Bachelor's degree. College graduates in physics are far short of the number needed.

The undergraduate curriculum in physics offers a thorough coverage of the phenomena of classical, atomic, and nuclear physics, while developing the student's mathematical tools to the point where he can deal resourcefully and constructively with these phenomena. It also provides a grounding in related sciences, linguistic techniques, and general education. Elective time permits further broadening of the student's education or a degree of concentration in some phases of engineering.

## FRESHMAN YEAR

(See page 170)

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Biology 115**<br>Survey of Biology | **(3-3)** | **4** |
| **English 203**<br>Introduction to Literature | **(2-0)** | **2** |
| **Mathematics 210**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1] | **(3-0)** | **3** |
| **Physics 219**<br>Sound, Light, Electricity | **(3-3)** | **4** |
| **Physical Education 201** | **(0-2)** | **R** |
| | | **17** |

| Second Semester | | Credit |
|---|---|---|
| **English 210**<br>Introduction to Logical Discourse | **(2-0)** | **2** |
| **History 106**<br>History of the United States | **(3-0)** | **3** |
| **Mathematics 307**<br>Calculus | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** |
| **Modern Language**[1] | **(3-0)** | **3** |
| **Physics 220**<br>Modern Physics | **(3-3)** | **4** |
| **Physical Education 202** | **(0-2)** | **R** |
| | | **16** |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Mathematics 308**<br>Differential Equations | **(3-0)** | **3** |
| **Modern Language**[1] | **(3-0)** | **3** |
| **Physics 301**<br>Heat | **(3-3)** | **4** |
| **Physics 401**<br>Optics | **(3-3)** | **4** |
| **Elective**[2] | | **4** |
| | | **18** |

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | **(3-0)** | **3** |
| **Mathematics 405**<br>Vector Analysis | **(3-0)** | **3** |
| **Modern Language**[1] | **(3-0)** | **3** |
| **Physics 302**<br>Mechanical Properties of Matter | **(2-3)** | **3** |
| **Physics 413**<br>Electricity and Magnetism | **(2-3)** | **3** |
| **Elective**[2] | | **3** |
| | | 13 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | **(3-0)** | **3** |
| **Physics 311**<br>Atomic and Nuclear Physics | **(3-0)** | **3** |
| **Physics 405**<br>Physical Mechanics | **(3-0)** | **3** |
| **Physics 414**<br>Electricity and Magnetism | **(1-3)** | **2** |
| **Elective**[2] | | **6** |
| | | **17** |

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | **(1-2)** | **2** |
| **Government 306**<br>American National Government | **(3-0)** | **3** |
| **Physics 312**<br>Atomic and Nuclear Physics | **(2-3)** | **3** |
| **Physics 416**<br>Electromagnetic Fields | **(3-0)** | **3** |
| **Elective**[2] | | **6** |
| | | **17** |

NOTES: 1. See "The Foreign Language Requirement," page 141. German or Russian is recommended normally.

2. Electives should be selected in consultation with, and on approval of, the Head of the Department with two objectives in view: (1) to strengthen the broad foundation expected of students who specialize in physics; (2) to intensify the student's program in the direction of a specific competence. For objective (1) are recommended electives in other sciences, especially chemistry; electives in basic engineering courses, such as DC and AC machinery, circuit theory, electronics, engineering mechanics, mechanics of materials, thermodynamics, engineering drawing (Engineering Graphics 105), and machine shop (Mechanical Engineering 309); and electives in mathematics, languages, the humanities, and social sciences.

Objective (2) is determined by the student's interests and plans for the future. He may aspire to a career of advancing knowledge of fundamental physics through basic research on physics phenomena or through college teaching. In this case the student must plan on postgraduate study and should choose his electives to increase his intellectual equipment in mathematics and to widen his range of acquaintance with subjects in physics and other sciences and fields important for an educated man. If the student is interested in research in physics bearing on a field of some other science, such as chemistry, geology, meteorology, oceanography, or biology, a heavy concentration of electives should be made in that science. The student preparing for a career in high school teaching should elect the requisite courses in education. A student planning to go directly into industry upon graduation should concentrate a large portion of his electives in a sequence of courses proceeding to an advanced stage in, for instance, aeronautical engineering, communications and electronics in electrical engineering, or vibrations and the mechanics of materials, or thermodynamics and heat transfer in mechanical engineering.

# THE SCHOOL OF ENGINEERING

## GENERAL STATEMENT

Probably no profession has contributed more to raise the standards of living for mankind and to provide him with the conveniences to make life more enjoyable and the leisure in which to enjoy it, than has engineering. The rapid rate of development in scientific and industrial fields has created a demand for a large number of capable young men in engineering. Today engineering is the second largest profession and employs more men than any other.

The engineer is an applied scientist. It is his responsibility to utilize known laws in the physical sciences and mathematics in ways which make them valuable to mankind. He must understand the physical laws and phenomena and must see how they can be applied. He must conceive the idea, design the product, select the materials, determine the market, plan the production, often design the machines for production, and control costs to the point where the product can be sold at a profit. This involves men, materials, methods, and money.

The present high standards of living in many parts of the world are ample evidence of the work of the engineer. The comforts and conveniences in our homes, the availability of running water, electricity, gas and sewage disposal systems are things that are just taken for granted. The fine automobiles, the excellent highways, the luxurious airplanes, the long range missiles and the orbiting satellites are a few concrete evidences of the work of the engineer. Sometimes known principles and physical laws lie idle and are unused for many, many years before the engineer utilizes them and builds the equipment to make them useful.

Engineering touches nearly every facet of our lives and requires men with depth, breadth, and versatility. Although the fundamental education is the same for all engineers, the field is so broad that specialization is necessary. Usually four years of college are required to complete requirements for a Bachelor's degree in some branch of engineering, but some schools are now requiring five. Engineering is becoming more highly technical and involved, and advanced study is highly desirable for those who expect to become specialists of high competence.

Students who expect to enter engineering should make their decision early, so that their courses in both junior high and high school include thorough preparation in mathematics, the physical sciences, English, and the social sciences. Four years of English; two or more years of algebra; a half year of trigonometry; all the geometry, both plane and solid, that is offered; a year each of biology, chemistry, and physics; two years or more in the social sciences; and additional elective credits such as drawing and shopwork form a good foundation. The student should enjoy solving problems, since this is one of the engineer's primary responsibilities.

Employment opportunities for graduate engineers have been quite good for the past 20 years, and it appears that the demand will continue to exceed the supply in the foreseeable future. For those who hold M.S. or Ph.D. degrees, the demand is becoming much stronger and premium salaries are paid for these individuals.

## CURRICULA

### Four-Year Curricula

Each of the following curricula leads to the Bachelor of Science degree and requires a normal period of four years for completion.

(See next page for curricula.)

- Aeronautical Engineering
- *Agricultural Engineering
- Chemical Engineering
- Civil Engineering
- Electrical Engineering
- Geological Engineering
- Geology
- Geophysics
- Industrial Education
- Industrial Engineering
- Landscape Architecture
- Mechanical Engineering
- Petroleum Engineering

### Five-Year Curricula

The following five-year programs lead to the Bachelor of Architecture and Bachelor of Petroleum Engineering degrees respectively:

- Architecture (Design Option)
- Petroleum Engineering

The five-year curriculum in Architecture (Construction Option) leads to the degree of Bachelor of Science in Architectural Construction.

### Five-Year Combined Degree Plans

Students who are interested in two areas of engineering or a business foundation to complement their engineering curriculum may pursue programs which lead to two Bachelor's degrees in five years. The following curricula are examples; students interested in other possible combinations should consult with the Dean of Engineering.

- Chemical Engineering—General Business
- Civil Engineering—General Business
- Geology—Petroleum Engineering
- **Industrial Engineering
- Petroleum Engineering—General Business
- Petroleum Engineering—Chemical Engineering
- Petroleum Engineering—Geological Engineering
- Petroleum Engineering—Mechanical Engineering

Students may also pursue a five-year program combining full professional training with a broad general education to qualify for two degrees, the Bachelor of Science degree in a professional field and the Bachelor of Arts degree in one of the liberal arts curricula such as English (See page 94, "Two Degrees"). Other combinations are available such as a five-year combined program in the various industrial education options and journalism, which prepares the student to become an industrial journalist.

## NUCLEAR PROGRAM

The College now offers Master of Science and Ph.D. degrees in Nuclear Engineering. An explanation of these plans appears under advanced study.

## ADVANCED STUDY

As the knowledge required for advanced engineering design in industry increases, more and more students are finding it desirable to go beyond the usual four-year course in college. Much of the design in industry today follows the research mode of procedure, the procedure predominantly used in graduate study. Consequently, there has been a growth in graduate study to satisfy

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*Administered jointly by Schools of Agriculture and Engineering.

**A degree of Bachelor of Science in Industrial Engineering may be awarded on the basis of the student's completing the requirements for the degree of Bachelor of Science in Aeronautical, Chemical, Civil, Electrical, Mechanical, or Petroleum Engineering and additional required courses.

the demands of industry for engineers with greater scientific knowledge and research ability. In the future, industry, colleges, and governmental agencies will carry on more and more research, and, therefore, there will continue to be a great demand for engineers with graduate training through the doctorate. It should be pointed out, however, that graduate study is available only to those with more than average ability.

Students who are interested in pursuing one of the above graduate programs should take the regular undergraduate program in Aeronautical Engineering, Chemical Engineering, Civil Engineering, Electrical Engineering, Mechanical Engineering, Petroleum Engineering, Chemistry, Mathematics, or Physics. The following are recommended as electives for the undergraduate program, with the most important listed first. These courses should be taken only after consultation with the head of the student's major department.

| | |
|---|---|
| Physics 311 | Atomic and Nuclear Physics |
| Physics 312 | Atomic and Nuclear Physics |
| Nuclear Engineering 401 | Nuclear Engineering |
| Nuclear Engineering 402 | Industrial Applications of Radioisotopes |

An AGN-201 Nuclear Training Reactor is available for use in the nuclear technology work. In the fall of 1961 the 5 megawatt research reactor in the A. and M. Nuclear Science Center will become available for student training and research.

Prospective graduate students should write to the Director of Admissions for a Graduate School Catalogue.

## AERONAUTICAL ENGINEERING

Aeronautical engineering is described as the technical activities associated with the development of aircraft and missiles. These include research, analysis, and design in several technical specialities such as aerodynamics, dynamics of aircraft, structures, properties of materials and propulsion.

Aeronautical engineering graduates are employed in air-frame manufacturing companies, government research labaratories, and equipment manufacturing companies in Texas and elsewhere. A considerable number enter the military services as engineering officers. Aeronautical engineering graduates are also well qualified for positions in other fields of engineering, since men trained in aerodynamics and the design of high-strength, light-weight structures are in demand in many industries.

The Aeronautical Engineering Department has excellent facilities in the new Engineering Building on the campus and at the College-owned Easterwood Airport. Facilities on the campus include a supersonic wind tunnel, an instructional low-speed wind tunnel, a structures laboratory, a materials and process laboratory, and complete shop facilities. The Aeronautical Laboratories, including the large wind tunnel, are located at Easterwood Airport.

The four-year undergraduate curriculum in aeronautical engineering leading to the degree of Bachelor of Science includes sound preparation in mathematics, physics, chemistry, English, and mechanics. The junior and senior years are devoted largely to the professional courses in aerodynamics, aircraft structures, aircraft power plants, and aircraft design. The opportunity to elect courses in a desired specialty is provided in the senior year.

## AGRICULTURAL ENGINEERING

See page 110 for a discussion of this curriculum.

## ARCHITECTURE

The Division of Architecture offers a program designed to provide young men with a broad and balanced background of fundamental training for professional careers in the design and construction of buildings. The students are encouraged to develop sensibly and to apply their acquired fundamental knowledge and skills to the solutions of social and architectural problems of contemporary society. While they must develop the capacity to analyze, plan, and organize space to serve the needs and welfare of man, they must supplement this with full recognition of their professional responsibilities to an individual as well as to his community.

Architectural design is taught in a series of stages defined in the courses of instruction. The students are assigned problems to be solved individually varying in length and scope. Individual guidance and criticism are given by the instructor accompanied with direction in the use of reference material in the library. The curriculum for the first two years is designed to give the student fundamental training in the techniques of drafting and an appreciation and understanding of the elementary principles of design and construction. The work of the last three years is built around more comprehensive problems of architecture.

Two options are offered: the Design Option and the Construction Option. The program is the same during the first year. This makes it possible for the student to defer his decision until the beginning of his sophomore year, when he can more intelligently select his course of study. Both options are five-year courses. The Design Option leads to the degree of Bachelor of Architecture; the Construction Option, to the degree of Bachelor of Science in Architectural Construction.

While the programs are designed primarily to prepare young men for professional careers in architecture and building construction, the training forms a good foundation for those who may wish to enter other fields. Graduates find their way into the profession as draftsmen, designers, estimators, superintendents of construction, and develop careers as architects, contractors, and city and regional planners.

The Division of Architecture is a member of the Association of Collegiate Schools of Architecture, is on the approved list of schools accepted by the Texas Board of Architectural Examiners, and is accredited by the National Architectural Accrediting Board.

## LANDSCAPE ARCHITECTURE

A program of landscape architecture is also offered by the Division of Architecture. This program is designed to help students attain proficiency in the arrangement of ground and water forms and objects thereon for the purpose of securing the greatest returns in human use and enjoyment.

A successful landscape architect must possess or develop an artistic sense, engineering ability, the fundamentals of design and plant science, in addition to a knowledge of the basic elements of land, water, vegetation, and the forces of nature.

Graduates are employed in private practice; by city, state, and regional planning boards; as managers of city park systems, university campuses, cemeteries, arboretums, and in various phases of activity with the National Park Service. Splendid opportunities also exist in teaching, extension, and research in this field.

## CHEMICAL ENGINEERING

Chemical engineering is that branch of engineering concerned with the development and application of manufacturing processes in which chemical or certain physical changes of materials are involved. These processes may usually be resolved into a coordinated series of unit physical operations and unit chemical processes. The work of the chemical engineer is concerned primarily with the design, construction, and operation of equipment and plants in which series of these unit operations and processes are applied. Chemistry, physics, and mathematics are the underlying sciences of chemical engineering, and economics is its guide in practice.

Chemical engineering became a separate division of engineering with the growth of strictly chemical industries, and it is now recognized as one of the important divisions of engineering, dealing with combustion of fuels, heat treatment of metals and alloys, the preparation of water for potable and industrial use, the refining of petroleum, processing of vegetable oils, the development of electric furnace products, portland cement, lime gypsum, plaster, heavy chemicals, soaps, rubber, corn products, textiles, paper, artificial leather and silks, food products, and other products.

The work of the chemical engineer is the changing of raw materials into finished products with the greatest efficiency and economy. He substitutes a rigid control of processes for guess work and uncertainty and increases the productivity of labor by supplying more efficient processes where the standard and quality of the finished product are revised and the amount of seconds and rejections is reduced. The chemical engineer must also be able to modify a process in order to adapt it to commercial conditions and to select his material for construction with special reference to its use. His work is distinct from that of the chemist on the one hand and the mechanical engineer on the other, though he must have a thorough training in both chemistry and engineering.

The curriculum in chemical engineering is planned to prepare students for the design, construction, and operation of industries in which materials undergo chemical and physical change. The unit operations, such as fluid flow, heat flow, evaporation, drying, distillation, gas absorption, filtration, crushing and grinding, and size separation are basic studies that may be applied to any industry. General chemical processes are also included in the laboratory and classroom work. Research in both of these divisions is fostered by cooperative projects with the Texas Engineering Experiment Station and industrial organizations of the State.

As chemical engineering treats of the processes whereby materials undergo a chemical and physical change, it is apparent that a large number of diversified industries have use for the chemical engineer, not only in the operation and control of processes but in the design of special equipment. Many chemical engineers enter the reasearch laboratory, investigating processes in the laboratory and supervising their operation in the plants, considering carefully the controlling interest of cost as a factor in all industrial operations.

## CIVIL ENGINEERING

The curriculum in civil engineering has for its objective the thorough grounding of young men in the underlying principles of the basic sciences and engineering. Training or practice in the art of applying these principles to problems encountered in practice is given in the drafting room, laboratories, and in the field so as to enable the graduate to give satisfactory service in an engineering organization immediately upon graduation.

During the first three years the subject matter of the courses is common to all phases of civil engineering, such as surveying, highway engineering, mechanics, strength of materials, hydraulics, and stress analysis. In the fourth year the student is given an opportunity to specialize moderately in structural engineering, highway engineering, hydraulic engineering, or municipal and sanitary engineering. In addition, courses in cost estimating and engineering economy are required of all the students to give them an understanding of the importance of these matters in the practice of civil engineering.

Students who are interested in construction engineering should consider the possibility of obtaining a Bachelor of Science degree in Civil Engineering and a Bachelor of Business Administration degree. Copies of a degree plan to satisfy the requirements for both degrees may be obtained from the Civil Engineering Department.

The moderate specialization indicated above does not restrict the student to securing employment in a special field. The curriculum is so planned as to make it possible for him to undertake professional practice embracing the following: surveying; water supply; sewerage; the planning, design, and construction of buildings, bridges, earthen dams, reservoirs, canals, and the conventional types of foundations required for all of the structures; planning, design, construction, and maintenance of roads and highways; traffic engineering; planning and execution of sanitary measures for rural and urban communities; administration of city business as city manager; industrial, academic, and governmental research of civil engineering matters; and technical service of various kinds leading to executive positions in industry.

## ELECTRICAL ENGINEERING

The curriculum in electrical engineering is designed to give the student thorough training in the principles on which electrical phenomena are based. Instruction is provided in the basic sciences and mathematics that serve as the foundation for an engineering career.

The program for the first two years includes mathematics, physics, chemistry, and electrical science together with courses in English, history, economics, and other social and humanistic studies. The third year is devoted largely to the engineering sciences that are appropriate to all fields of electrical engineering. The program in the fourth year consists of studies of a professional nature illustrating the applications of engineering principles to typical problems in the fields of electronics, machinery, and communications. Elective courses in the fourth year permit the student to develop his interest in some particular field of electrical engineering.

Electrical engineering offers many opportunities to young men with suitable training. Graduates presently find employment in the aircraft and missile industry, public utilities, the petroleum industry, communications, and with electrical and electronic manufacturers. Electrical engineering education provides the necessary background for research, design and development, operations, management, and sales in the several industries in which electrical engineers work.

Students who expect to enroll in electrical engineering after attending another college should note that there is a six-semester sequence of electrical engineering courses in the curriculum. If the prerequisites are satisfied, transfer students may complete this sequence in two years and one summer session and should plan to transfer at the beginning of the summer session.

Student branches of the Institute of Radio Engineers and the American Institute of Electrical Engineers have been organized on the campus, and membership in one or both of these organizations serves to keep the student informed about current developments in the field of electrical engineering.

## GEOLOGY

Training in geology is designed to prepare the student in the fundamentals of the earth sciences. These include the study of rocks, minerals, fossils, earth structures, the physical features of the earth's surface, and the economic application of this knowledge.

This curriculum is designed for the student who approaches geology as a science, with the inherent obligation of exploring, observing, analyzing, inquiring, classifying, describing, and finally interpreting the record and the content of the rocks. It is based upon the related sciences of chemistry, physics, mathematics, and biology. It prepares a man either for general geological investigations or for graduate study in geology in a normal period of four years.

## GEOLOGICAL ENGINEERING

The curriculum in geological engineering provides training in the fundamental principles of engineering as well as specialized training in geology in a normal period of four years. Although this course is designed primarily for the student who expects to be employed as a petroleum geologist, the curriculum is such that the graduate is also qualified for work with railroads, public utilities, construction, ceramics, and other industries in which a knowledge of both geology and engineering is desirable.

Students interested in construction engineering and soil mechanics should consider obtaining a Bachelor of Science degree in Geological Engineering and a Bachelor of Science degree in Civil Engineering. Copies of a degree plan to satisfy requirements for both degrees may be obtained from the Civil Engineering or the Geology Department.

In addition to the above degree programs, five-year combination degree curricula may be arranged, such as geological engineering—general business, geological engineering—petroleum engineering, or geological engineering—English for a student desiring a broader educational background.

## GEOPHYSICS

This curriculum is designed to prepare students to investigate geologic features with physical measurements. The objective is to gain skill in geologic interpretations of data obtained with such measurements. It is concerned primarily with a fundamental understanding of geology, and secondly with mathematics, physics, and electrical engineering. The curriculum prepares a student either for general geological or geophysical investigations, or for graduate study in either of these subjects in a normal period of four years.

## INDUSTRIAL EDUCATION

This department has several options which prepare students for teaching positions and for employment in industry. These several options are described below.

### Industrial Arts Teacher Education

This curriculum prepares young men to teach industrial arts in the junior or senior high schools or in technical schools. The students completing this four-year program receive the Bachelor of Science degree and are qualified to receive the appropriate teaching certificate from the Texas Education Agency. Industrial arts includes such areas as general shop, electricity, metals, woodworking, drafting, plastics, ceramics, leather, and other craft courses. The students may also qualify in this program for a certificate to teach driver training in the public schools.

### Vocational Industrial Teacher Education

This program is designed for teachers, supervisors, and directors of vocational educational schools and classes of Texas. Since the men completing this course are to qualify as teachers under the State Plan for Vocational Education, the candidate must satisfy the requirements for one of the classes of vocational teachers as specified in the State Plan.

### Industrial Technology

The curriculum in industrial technology is planned to prepare young men for positions in industry pertaining to safety, supervision, production, and employee training. Students pursuing this pattern must take the technical electives as indicated on page 201.

### Industrial Distribution

This is a four-year program which prepares for industrial technical sales (Industrial Distribution). The demand for graduates with technical sales potential is increasing annually and employment opportunities are plentiful at this time. Those pursuing this pattern should take the technical electives as indicated on page 201.

## INDUSTRIAL ENGINEERING

Industrial engineering is the science of production. Just as the other branches of engineering use the laws of the physical sciences in the design and operation of a product, so does industrial engineering apply these same laws to the design, selection, and operation of the plant in which this product is produced. A major distinction between industrial engineering and other branches is that the industrial engineer must consider not only the behavior of inanimate objects as they are governed by physical laws, but also must include in his plan the behavior of people as they operate together in organizations, whether these organizations be simple or complex.

Although usually the industrial engineer is concerned with the production of a manufactured article, the same principles of scientific analysis, planning, and control which are effective in this field have been found to be quite useful in any activity where a large number of people work together. Thus, industrial engineers find employment in wholesale trade, in transportation, even in banks and insurance companies. Because of the increasing technical complexity of today's manufacturing operations, there is a rapidly increasing demand for men with engineering background to enter the field of factory design and operation.

### Four-Year Curriculum

The four-year curriculum leading to the Bachelor of Science degree in industrial engineering fills the above need by providing training in the basic engineering subjects of mathematics, physics, drawing, chemistry, and mechanics which are common to most engineering curricula. Beyond this, it gives students training in manufacturing processes, setting time standards, production control, quality control, tool engineering, cost analysis, factory design, industrial relations, and operations research. This combination well equips the graduate who plans to make his career that of production control and supervision.

### Five-Year Curriculum

Since there is an insistent and growing demand for men versed in the fundamentals of other branches of engineering and also in the fundamentals of executive control, there are offered five-year curricula designed for students who wish training in industrial and in aeronautical, chemical, civil, electrical, mechanical, or petroleum engineering. Thus, in five years the student may complete the requirements for two Bachelor of Science degrees, one in his preferred specialty of engineering and the other in the field of industrial engineering. The completion of the requirements for these two degrees should admirably prepare the engineering graduate for rapid advancement.

Students desiring to work toward the two degrees should consult with the Director of Admissions and Registrar or the Head of the Industrial Engineering Department for the course requirements. The industrial engineering courses may be taken either concurrently with courses in any of the above branches, which will enable the students to get both degrees at the same time, or may be taken after the first degree is granted. Ordinarily two semesters of additional work are sufficient to complete the requirements for the second degree in industrial engineering.

## MECHANICAL ENGINEERING

The breadth of the field of mechanical engineering is such that extensive specialization in undergraduate work is impossible and undesirable. Industry needs mechanical engineers for such a variety of work that it is deemed wise to make the curriculum broad and fundamental.

Training in habits of accurate analysis and logical thinking, the prerequisites of a good engineer, is emphasized.

Fundamental theory courses are supplemented by laboratory work in pattern making, foundry, machining, welding, and experimentation. Laboratory courses are designed to instruct in methods rather than to develop extensive skills.

Some specialization is possible in that during the senior year the student may elect courses in such fields as air conditioning, automotive engineering, internal combustion engines, turbines, marine engineering, and data processing.

The work of practicing mechanical engineers varies from general engineering to highly specialized fields. The work logically falls under **design, construction and erection, operation and maintenance, research, administration, and sales.**

**Design engineers** may find their work to be that of original design of machines and associated equipment; design of operating assemblies of machines and equipment commercially available for desired manufacturing or process jobs; redesign of existing equipment to make possible changes, to improve economy, safety, and appearance.

**Construction and erection engineers** may be responsible for assembling and fabricating entire plants and putting them into operation. They must be able to use engineering drawings, plans and specifications, and to do supplementary design work.

**Operation and maintenance engineers** are in charge of plant performance and upkeep. They must be capable of securing profitable operation and of the supervision of plant personnel.

**Research engineers** are called on for an endless variety of investigations. They must have inquiring minds, initiative, patience, thorough knowledge of the fields in which they work, and the ability to analyze and correlate the results obtained. For the research man, graduate study is recommended.

Many engineers who have the leadership ability, personality, tact, and initiative become **administrators and executives.**

**Sales engineers** are probably as much in demand as any other group.

Among the industries that employ a large number of mechanical engineers are: air conditioning, aircraft, automotive, chemical, power, petroleum, refrigeration, and general manufacturing.

## PETROLEUM ENGINEERING

The curricula in petroleum engineering are intended to prepare students for the petroleum industry and particularly for those branches which have to do with drilling, production, and transportation of petroleum as well as with the natural gas industry.

Four courses in petroleum engineering are available to the students in this department: (1) a regular four-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Science; (2) a five-year curriculum in petroleum engineering, which leads to a degree of Bachelor of Petroleum Engineering; (3) a five-year curriculum in petroleum engineering—geological engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Geological Engineering; (4) a five-year curriculum in petroleum engineering—mechanical engineering, which leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering.

The four-year curriculum in petroleum engineering includes sufficient training in civil, mechanical, and electrical engineering to prepare the graduate for the application of engineering principles to the petroleum industry. Courses in geology give an understanding of the geological structures and conditions favorable for petroleum deposits. To the basic subjects are added courses in petroleum engineering which illlustrate the application of engineering principles to the type of problems met in the petroleum industry and which also give some understanding of the technique of the industry. Emphasis is placed on thorough grounding in the fundamentals rather than on application to particular problems.

The five-year curriculum in petroleum engineering is designed to provide a broader educational background. This curriculum contains all the courses included in the four-year curriculum and courses in psychology, accounting, English, economics, business, geography, and advanced mathematics.

In addition to these specific degree programs, five-year combination degree curricula may be arranged, such as petroleum engineering—general business, petroleum engineering—chemical engineering, petroleum engineering—industrial engineering, or petroleum engineering—English for one desiring a broader educational background. Those desiring the five-year combination degree curricula in petroleum engineering and another field should contact the Head of the Petroleum Engineering Department for assistance in planning the course of study.

### PETROLEUM ENGINEERING—GEOLOGICAL ENGINEERING

The five-year petroleum engineering — geological engineering course includes all of the subjects given in the four-year petroleum engineering course and all of the subjects in the four-year geological engineering course. This combination five-year course is intended to give a student interested in geology a background in engineering and the application of geology and engineering to the petroleum industry.

### PETROLEUM ENGINEERING—MECHANICAL ENGINEERING

The five-year curriculum in petroleum engineering—mechanical engineering leads to Bachelor of Science degrees in both Petroleum Engineering and Mechanical Engineering. The scope of the work in the petroleum industry is so broad and so varied that it is desirable for the man who expects to enter this field to have a very comprehensive training. This course is designed to give such breadth of training by including the essential courses in both the petroleum and mechanical curricula. The production, transportation, and refining of oil involve the generation and utilization of power, the design and operation of mechanical equipment, the principles of heat transfer, and the handling of men and finances. Thus, a five-year curriculum combining the two courses was deemed desirable.

## Curricula in ARCHITECTURE AND ARCHITECTURAL CONSTRUCTION

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 105**<br>Carpentry and Mill Work | (1-6) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Basic 106**<br>Survey of Man's Knowledge | (0-2) | 1 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 17 |

### DESIGN OPTION

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 |
| **Architecture 227**<br>Structural Principles | (3-0) | 3 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 301**<br>Design III | (0-15) | 5 |
| **Architecture 305**<br>Graphic Art | (0-6) | 2 |
| **Architecture 325**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 327**<br>Basic Structures | (3-0) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Architecture 302**<br>Design III | (0-15) | 5 |
| **Architecture 306**<br>Graphic Art | (0-6) | 2 |
| **Architecture 326**<br>Survey of Contemporary Art | (1-0) | 1 |
| **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| | | 17 |

### SENIOR YEAR

| | | |
|---|---|---|
| **Architecture 401**<br>Design IV | (0-15) | 5 |
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 |
| **English 371**<br>Great Books | (3-0) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Architecture 402**<br>Design IV | (0-15) | 5 |
| **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Architecture 501**<br>Design V | (0-15) | 5 | **Architecture 502**<br>Design V | (0-15) | 5 |
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 556**<br>City Planning | (2-3) | 3 | **Architecture 554**<br>Professional Practice | (2-0) | 2 |
| **Landscape Architecture 411**<br>Landscape Design for the Architect and Engineer | (2-2) | 3 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Elective (Humanities)** | | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| | | | **Government 306**<br>American National Government | (3-0) | 3 |
| | | 17 | | | 16 |

## CONSTRUCTION OPTION

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 201**<br>Design II | (0-12) | 4 | **Architecture 202**<br>Design II | (0-12) | 4 |
| **Architecture 205**<br>Graphic Art | (0-6) | 2 | **Architecture 206**<br>Graphic Art | (0-6) | 2 |
| **Architecture 253**<br>Technology of Materials | (2-0) | 2 | **Architecture 228**<br>Elements of Mechanics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Architecture 254**<br>Technology of Materials | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 | **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 | **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 327**<br>Basic Structures | (3-0) | 3 | **Architecture 328**<br>Steel Structures | (2-2) | 3 |
| **Architecture 335**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 | **Architecture 336**<br>Mechanical and Electrical Equipment for Buildings | (3-0) | 3 |
| **Architecture 339**<br>Art and Civilization | (3-0) | 3 | **Architecture 340**<br>History of Architecture | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Geology 422**<br>Natural Structural Materials | (2-3) | 3 |
| | | 17 | | | 16 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 427**<br>Concrete Structures | (2-3) | 3 | **Architecture 428**<br>Roof Structures | (2-3) | 3 |
| **Architecture 439**<br>History of Architecture | (3-0) | 3 | **Architecture 440**<br>History of Architecture | (3-0) | 3 |
| **Architecture 454**<br>Specifications and Working Drawings | (1-6) | 3 | **Business Administration 433**<br>Business Management | (3-0) | 3 |
| **Business Administration 428**<br>Real Estate Titles and Conveyances | (3-0) | 3 | **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Elective (Humanities)** | | 2 | **Elective (Humanities)** | | 2 |
| | | 17 | | | 17 |

## SUMMER WORK

Architecture 500; Summer Practice, twelve weeks, required.

## FIFTH YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Architecture 527**<br>Structural Systems | (2-3) | 3 | **Architecture 528**<br>Structural Systems | (2-3) | 3 |
| **Architecture 554**<br>Professional Practice | (2-0) | 2 | **Architecture 581**<br>Seminar | (1-0) | 1 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Elective** | | 10 |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 | | | 17 |
| **Elective (Humanities)** | | 3 | | | |
| | | 17 | | | |

## Curriculum in
## LANDSCAPE ARCHITECTURE

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Biology 101**<br>General Botany of Seed Plants | (2-3) | 3 | **Biology 102**<br>Taxonomy of Flowering Plants | (2-3) | 3 |
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 17 | | | 17 |

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Architecture 101**<br>Design I | (0-6) | 2 | **Architecture 102**<br>Design I | (0-6) | 2 |
| **Architecture 115**<br>Architectural Graphics | (1-3) | 2 | **Architecture 116**<br>Architectural Graphics | (1-3) | 2 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Biology 206**<br>Introductory Microbiology | (2-4) | 3 |
| **Entomology 201**<br>General Entomology | (2-2) | 3 | **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Floriculture 206**<br>Ornamental Plants | (2-2) | 3 | **Floriculture 207**<br>Ornamental Plants | (2-2) | 3 |
| **Floriculture 221**<br>Fundamentals of Floriculture | (1-3) | 2 | **Floriculture 224**<br>Principles of Floral Designing | (1-3) | 2 |
| **Military or Air Science** | (0-3) | 1 | **Landscape Architecture 201**<br>History of Landscape Design | (2-0) | 2 |
| **Physical Education 201** | (0-2) | R | **Military or Air Science** | (0-3) | 1 |
| | | 17 | **Physical Education 202** | (0-2) | R |
| | | | | | 17 |

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Agronomy 301**<br>Soil Science | (3-2) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Landscape Architecture 301**<br>Introductory Landscape Design | (1-6) | 3 | **Floriculture 320**<br>Garden Flowers | (1-3) | 2 |
| **Plant Physiology and Pathology 301**<br>Plant Pathology | (2-3) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Elective** | | 8 | **Landscape Architecture 302**<br>Landscape Design and Construction | (1-6) | 3 |
| | | 18 | **Elective** | | 7 |
| | | | | | 18 |

### SUMMER WORK

Landscape Architecture 300; Summer Practice, ten weeks, required.

### SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Agronomy 428**<br>Turf Management | (2-2) | 3 | **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 | **Floriculture 325**<br>Marketing of Ornamental Plants | (3-0) | 3 |
| **Floriculture 319**<br>Exotic Plants | (1-3) | 2 | **Landscape Architecture 408**<br>Park Management | (2-0) | 2 |
| **Landscape Architecture 305**<br>Planting Design | (1-3) | 2 | **Landscape Architecture 410**<br>Advanced Landscape Design | (1-6) | 3 |
| **Landscape Architecture 407**<br>Landscape Maintenance | (1-3) | 2 | **Elective** | | 8 |
| **Landscape Architecture 409**<br>Intermediate Landscape Design | (1-6) | 3 | | | 18 |
| **Elective** | | 3 | | | |
| | | 18 | | | |

## Curricula in
## ENGINEERING

(With the exception of architecture, geology, and industrial education, all curricula in the School of Engineering are identical in the freshman year.)

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Mathematics 120**<br>Analytic Geometry and Calculus | (5-0) | 5 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Physics 218**<br>Mechanics and Heat | (3-3) | 4 |
| **Military or Air Science** | (0-3) | 1 | **Physical Education 102** | (0-2) | R |
| **Physical Education 101** | (0-2) | R | | | 19 |
| | | 19 | | | |

## Curriculum in
## AERONAUTICAL ENGINEERING

### FRESHMAN YEAR
(See above)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 201**<br>Elementary Aerodynamics | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 | **Physical Education 202** | (0-2) | R |
| | | | | | 19 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Aeronautical Engineering 301**<br>Theoretical Aerodynamics | (3-0) | 3 | **Aeronautical Engineering 302**<br>Experimental Aerodynamics | (1-3) | 2 |
| **Aeronautical Engineering 304**<br>Elementary Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 303**<br>High Speed Aerodynamics | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Aeronautical Engineering 306**<br>Strength of Aircraft Materials | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 | **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| | | 16 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 401**<br>Aircraft Design | (2-6) | 4 | **Aeronautical Engineering 402**<br>Aircraft Design | (2-6) | 4 |
| **Aeronautical Engineering 405**<br>Aircraft Structures | (3-0) | 3 | **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 |
| **Aeronautical Engineering 406**<br>Aircraft Power Plant Operation | (2-3) | 3 | **Aeronautical Engineering 420**<br>Aircraft Vibration and Flutter | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 17 | **Elective (Humanities)** | | 3 |
| | | | | | 17 |

## Technical Electives for AERONAUTICAL ENGINEERING

| Group A | | | Group B | | |
|---|---|---|---|---|---|
| **Aeronautical Engineering 417**<br>Aircraft Propulsion Systems | (3-0) | 3 | **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Aeronautical Engineering 418**<br>Advanced Aerodynamics | (4-0) | 4 | **Mathematics 405**<br>Vector Analysis | (3-0) | 3 |
| **Aeronautical Engineering 421**<br>Dynamics of Airplanes | (3-0) | 3 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | | **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |

NOTE: At least one of the technical electives in the senior year must be selected from Group A.

## Curriculum in AGRICULTURAL ENGINEERING

(See page 130)

## Curriculum in CHEMICAL ENGINEERING

### FRESHMAN YEAR

(See page 188)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | **Chemical Engineering 204**<br>Elementary Chemical Engineering | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 20 | | | 19 |

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemical Engineering 304**<br>Unit Operations | (3-0) | 3 | **Chemical Engineering 314**<br>Unit Operations Laboratory | (0-3) | 1 |
| **Chemistry 316**<br>Quantitative Analysis | (2-6) | 4 | **Chemical Engineering 423**<br>Unit Operations | (3-0) | 3 |
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 | **Chemistry 317**<br>Quantitative Analysis | (2-6) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | | **Elective (Humanities)** | | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemical Engineering 409**<br>Oil and Gas Technology | (3-0) | 3 | **Chemical Engineering 426**<br>Plant Design | (2-6) | 4 |
| **Chemical Engineering 429**<br>Oil and Gas Technology Laboratory | (0-3) | 1 | **Chemical Engineering 428**<br>Industrial Chemical Processes | (3-0) | 3 |
| **Chemical Engineering 433**<br>Unit Operations Laboratory | (0-3) | 1 | **Chemical Engineering 464**<br>Chemical Engineering Kinetics | (3-0) | 3 |
| **Chemical Engineering 441**<br>Chemical Engineering Unit Processes | (3-0) | 3 | **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Chemical Engineering 454**<br>Chemical Engineering Thermodynamics | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Chemical Engineering 461**<br>Process Control and Instrumentation | (2-0) | 2 | | | 17 |
| **Chemical Engineering 481**<br>Seminar | (1-0) | 1 | | | |
| **Elective (Humanities)** | | 3 | | | |
| | | 17 | | | |

## Curriculum in
## CIVIL ENGINEERING

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 | **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 201** | (0-2) | R | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| | | 18 | **Physical Education 202** | (0-2) | R |
| | | | | | 17 |

## SUMMER WORK

Civil Engineering 300, Summer Surveying Practice, six weeks, credit 5

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 306**<br>Mechanics of Materials | (2-0) | 2 | **Civil Engineering 338**<br>Hydraulics of Drainage Structures | (2-0) | 2 |
| **Civil Engineering 311**<br>Hydraulics | (3-0) | 3 | **Civil Engineering 344**<br>Plain and Reinforced Concrete | (3-3) | 4 |
| **Civil Engineering 336**<br>Hydraulics Laboratory | (0-2) | 1 | **Civil Engineering 346**<br>Design of Members and Connections | (2-3) | 3 |
| **Civil Engineering 345**<br>Theory of Structures | (2-3) | 3 | **Civil Engineering 465**<br>Soil Mechanics and Foundations | (2-2) | 3 |
| **Geology 320**<br>Geology for Civil Engineers | (2-3) | 3 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 15 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Civil Engineering 401**<br>Water and Sewage Treatment | (2-2) | 3 |
| **Civil Engineering 407**<br>Highway Engineering | (3-0) | 3 |
| **Civil Engineering 443**<br>Materials of Construction | (1-3) | 2 |
| **Civil Engineering 473**<br>Cost Estimating | (3-0) | 3 |
| **Civil Engineering 483**<br>Analysis and Design of Structures | (2-3) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Civil Engineering 402**<br>Water Supply and Sewerage Practice | (2-2) | 3 |
| **Civil Engineering 448**<br>Engineering Economy | (2-0) | 2 |
| **Civil Engineering 481**<br>Seminar | (1-0) | 1 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Technical Elective** | | 3 |
| | | 17 |

## Technical Electives for CIVIL ENGINEERING

| (Offered in Fall Semester only) | | |
|---|---|---|
| **Civil Engineering 406**<br>Sanitation and Public Health | (3-0) | 3 |
| **Civil Engineering 408**<br>Municipal Administration | (3-0) | 3 |
| **Civil Engineering 457**<br>Traffic Engineering | (3-0) | 3 |
| **Civil Engineering 463**<br>Hydrology | (3-0) | 3 |
| **Civil Engineering 468**<br>Statically Indeterminate Structures | (2-3) | 3 |
| **Geology 441**<br>Advanced Engineering Geology | (3-3) | 4 |

| (Offered in Spring Semester only) | | |
|---|---|---|
| **Civil Engineering 403**<br>Sanitary Design | (2-3) | 3 |
| **Civil Engineering 417**<br>Bituminous Materials | (2-3) | 3 |
| **Civil Engineering 456**<br>Highway Design | (2-3) | 3 |
| **Civil Engineering 458**<br>Hydraulic Engineering | (3-0) | 3 |
| **Civil Engineering 470**<br>Aerial Photogrammetry | (2-3) | 3 |
| **Civil Engineering 478**<br>Construction Plant and Methods | (3-0) | 3 |
| **Civil Engineering 486**<br>Design of Prestressed Concrete Structures | (2-3) | 3 |

NOTE: By proper choice of technical electives, civil engineering students may specialize to some extent in highway, hydraulic, structural, construction, or sanitary engineering.

## Curriculum in ELECTRICAL ENGINEERING For classes entering in September 1960 and thereafter

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 201**<br>Electricity and Magnetism | (3-4) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 18 |

| | | |
|---|---|---|
| **Electrical Engineering 214**<br>Electrical Circuit Theory | (3-3) | 4 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 18 |

## SUMMER SESSION

| | | |
|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (9-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (9-0) | 3 |
| | | 6 |

NOTE: Transfer students who have completed 68 acceptable credits of college work and lack no more than 14 credits of courses required in the sophomore year may attend both summer terms (12 weeks) and arrange a schedule to complete the degree program in four additional semesters. Such students should confer with the departmental advisor before enrolling in the summer session.

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **English 231**[1]<br>Survey of English Literature | (3-0) | 3 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **English 232**[1]<br>Survey of English Literature | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 402**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 415**<br>Transmission Networks | (2-2) | 3 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 |
| **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 | **Elective**[3] | | 3 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 15 | | | 16 |

NOTES: 1. Any courses in English or American literature may be substituted for English 231 and 232.

2. Mathematics 405, 411, 414, 415, or 417 may be substituted for Mathematics 409.

3. Any junior or senior course from Group I, Humanistic-Social Electives, page 211, may be chosen.

## For classes graduating in 1961-62 and 1962-63

## JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 323**<br>Electrical Circuit Theory | (3-0) | 3 | **Electrical Engineering 322**<br>Electric and Magnetic Fields | (3-0) | 3 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 | **Electrical Engineering 324**<br>Electrical Circuit Theory | (3-0) | 3 |
| **Electrical Engineering 327**<br>Electrical Laboratory | (1-3) | 2 | **Electrical Engineering 326**<br>Electronic Circuits | (3-0) | 3 |
| **English 371**[1]<br>Great Books | (3-0) | 3 | **Electrical Engineering 328**<br>Electrical Laboratory | (1-3) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Mathematics 409**[2]<br>Advanced Calculus | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 | | | 17 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 401**<br>Electrical Machinery | (3-0) | 3 | **Electrical Engineering 402**<br>Electrical Machinery | (3-0) | 3 |
| **Electrical Engineering 403**<br>Electrical Laboratory | (0-6) | 2 | **Electrical Engineering 404**<br>Electrical Laboratory | (0-6) | 2 |
| **Electrical Engineering 415**<br>Transmission Networks | (2-2) | 3 | **Electrical Engineering 420**<br>Servomechanisms and Control Devices | (3-0) | 3 |
| **Electrical Engineering 432**<br>Economic Phases of Engineering | (2-0) | 2 | **Government 306**<br>American National Government | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Technical Elective** | | 3 |
| **Elective**[3] | | 3 | | | |
| | | 17 | | | 17 |

NOTES: 1. English 231 or 232 may be substituted for this course.

2. Mathematics 405, 411, 414, 415, or 417 may be substituted for this course.

3. Any junior or senior course from Group I, Humanistic-Social Electives, page 211, or any one of the technical electives for electrical engineering may be selected.

## Technical Electives for ELECTRICAL ENGINEERING

| | | | | | |
|---|---|---|---|---|---|
| **Electrical Engineering 406**<br>Electric Power Distribution and Transmission | (2-2) | 3 | **Electrical Engineering 454**<br>Advanced Electronic Circuits | (3-3) | 4 |
| **Electrical Engineering 428**<br>Communication Circuits | (2-3) | 3 | **Electrical Engineering 456**<br>Communication Theory | (3-0) | 3 |
| **Electrical Engineering 441**<br>Symmetrical Components of Polyphase Circuits | (3-0) | 3 | **Electrical Engineering 457**<br>Principles of Electronic Computers | (3-3) | 4 |
| **Electrical Engineering 451**<br>Applied Electromagnetic Theory | (3-0) | 3 | **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Electrical Engineering 452**<br>Ultra High Frequency Techniques | (2-3) | 3 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | | **Physics 405**<br>Physical Mechanics | (3-0) | 3 |

## Curriculum in GEOLOGY

### FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 101**<br>General Chemistry | (3-3) | 4 | **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 | **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 19 | | | 18 |

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physics 218**<br>Mechanics and Heat | (3-3) | 4 | **Physical Education 202** | (0-2) | R |
| **Physical Education 201** | (0-2) | R | | | 17 |
| | | 19 | | | |

### SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2

### JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 | **English 319**<br>Report Writing | (1-0) | 1 |
| **English 371**<br>Great Books | (3-0) | 3 | **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 423**<br>Micropaleontology | (1-6) | 3 |
| | | 16 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | | | | 17 |

### SUMMER CAMP
Geology 300, Field Geology, credit 6

### SENIOR YEAR

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Geology (three of the following)** | | | 9 | **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | | **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | | **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | | **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Geology 437**<br>Cenozoic Micropaleontology | (1-6) | 3 | | **Geology-Geophysics (any two)**** | | | 6 |
| **Geology 481**<br>Seminar | (1-0) | | 1 | **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 | **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Elective** | | | 3 | **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| | | | 17 | **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| | | | | **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| | | | | **Elective** | | | 3 |
| | | | | | | | 16 |

## Curriculum in
## GEOLOGICAL ENGINEERING

### FRESHMAN YEAR
(See page 188)

### SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 20 |

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*May be used as an elective.

**Three credit hours of Geology 399 may be substituted for Geology 409, 423, or 425.

## SUMMER CAMP

(Optional*)

Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 | **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 220**<br>Engineering Mechanics | (4-0) | 4 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 305****<br>Petroleum Development | (2-0) | 2 | **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| **Petroleum Engineering 307****<br>Petroleum Development Laboratory | (0-3) | 1 | **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 | | | 17 |

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | | |
|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | | 3 |
| **Geology (one of the following)** | | | 3 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | |
| **Geology 406**<br>Economic Geology | (3-0) | 3 | |
| **Geology 431**<br>Geomorphology | (2-3) | 3 | |
| **Geology 481**<br>Seminar | (1-0) | | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | | 4 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | | 3 |
| | | | 17 |

| | | | |
|---|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | | 4 |
| **English 401**<br>Public Speaking | (0-2) | | 1 |
| **Geology-Geophysics (two of the following***)** | | | 6 |
| **Geology 304**<br>Sedimentary Petrography | (2-3) | 3 | |
| **Geology 409**<br>Geology of Non-Metallics Other than Petroleum | (3-0) | 3 | |
| **Geology 423**<br>Micropaleontology | (1-6) | 3 | |
| **Geology 425**<br>Subsurface Geology | (2-3) | 3 | |
| **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 | |
| **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 | |
| **Geology 433**<br>Field Geology | (0-6) | | 2 |
| **Geology 482**<br>Seminar | (1-0) | | 1 |
| **Elective (Humanities)** | | | 3 |
| | | | 17 |

## Curriculum in GEOPHYSICS

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

(Same as for curriculum in geological engineering, page 194)

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*May be used as an elective.

**Civil Engineering 465, Soil Mechanics, may be substituted for Petroleum Engineering 305 and 307.

***Three credit hours of Geology 399 may be substituted for Geology 304, 409, 423, or 425.

## SUMMER CAMP
(Optional*)
Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Chemistry 344**<br>Physical Chemistry | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 | **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 | **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| | | 16 | | | 16 |

## SUMMER CAMP
Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **English 371**<br>Great Books | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 | **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 | **Geophysics 436**<br>Seismic Exploration | (2-3) | 3 |
| **Elective** | | 5 | **Geophysics 446**<br>Physics of the Earth | (3-0) | 3 |
| | | 17 | **Physics 418**<br>Theoretical Physics | (3-0) | 3 |
| | | | **Elective** | | 3 |
| | | | | | 17 |

## Curriculum in INDUSTRIAL EDUCATION

### Industrial Arts Teacher Education Option

## FRESHMAN YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 | **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 | **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Engineering Graphics 128**<br>Methods of Industrial Reproduction | (0-2) | 1 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 | **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **Industrial Education 107**<br>Industrial Materials and Manufacturing Processes | (2-3) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 | **Mathematics 103**<br>Plane Trigonometry | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R | **Physical Education 102** | (0-2) | R |
| | | 19 | | | 18 |

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*May be used as an elective.

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Education 121**<br>An Introduction to Education | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Industrial Education 205**<br>Ornamental Iron | (1-5) | 3 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 2 |
| **Physical Education 201** | (0-2) | R |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **Engineering Graphics 221**<br>Building Construction Drawing | (1-3) | 2 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 106**<br>Cabinet Making | (1-6) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

## JUNIOR YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Industrial Education 323**<br>Methods of Teaching Mechanical Drawing | (1-3) | 2 |
| **Industrial Education 327**<br>Industrial Arts Handcraft | (1-5) | 3 |
| **Industrial Education 334**<br>Upholstery | (1-3) | 2 |
| **Psychology 301**<br>Educational Psychology | (3-0) | 3 |
| **Elective** | | 4 |
| | | 19 |

| | | |
|---|---|---|
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 310**<br>Course Making | (2-0) | 2 |
| **Industrial Education 332**<br>Plastics and Ceramics | (1-3) | 2 |
| **Industrial Education 336**<br>Design in the Arts and Crafts | (1-3) | 2 |
| **Mechanical Engineering 329**<br>Advanced Cabinet Making | (1-6) | 3 |
| **Elective** | | 3 |
| | | 18 |

## SENIOR YEAR

| | | |
|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Industrial Education 301**<br>Methods of Teaching and Class Management | (3-0) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Education 404**<br>Visual Aids for Industrial Subjects | (1-2) | 2 |
| **Industrial Education 406**<br>Industrial Guidance | (2-0) | 2 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 |
| **Elective** | | 3 |
| | | 18 |

| | | |
|---|---|---|
| ***Government 305**<br>Government of the United States and Texas | (3-0) | 3 |
| **Industrial Education 419**<br>Laboratory of Industries Methods | (1-3) | 2 |
| **Industrial Education 442**<br>Supervised Teaching in Industrial Arts | (2-12) | 6 |
| **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Elective** | | 5 |
| | | 17 |

## Curriculum in
## INDUSTRIAL EDUCATION

### Vocational Industrial Teacher Education Option

(Prerequisite: At least one full year of employed experience at some skilled trade or industrial technical occupation.)

A student who desires to graduate under this plan must submit a written request accompanied by a statement of his employed practical experience.

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*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

Upon the approval of the request by the Head of the Department and the Dean of Engineering, the student will be permitted to plan a program within the limit of the courses listed below as approved by the Head of the Department.

Approved industrial experience will be evaluated in terms of college credits and, if acceptable to the Head of the Department and the Dean of the School of Engineering, may be used in the place of shop work on the basis of four credit hours for each year of experience up to a maximum of twenty credits. Approved teaching experience may be credited as practice teaching on the basis of two credit hours per year up to a maximum of six credits.

## REQUIRED COURSES

| GENERAL EDUCATION | | | Minimum Credits |
|---|---|---|---|
| **Economics** | | | 6 |
| Economics 203<br>Principles of Economics | (3-0) | 3 | |
| Economics (elective) | | 3 | |
| **English** | | | 10 |
| English 103<br>Composition and Rhetoric | (3-0) | 3 | |
| English 104<br>Composition and Rhetoric | (3-0) | 3 | |
| English 203<br>Introduction to Literature | (2-0) | 2 | |
| English 210<br>Introduction to Logical Discourse | (2-0) | 2 | |
| **Government** | | | 3 |
| *Government 305<br>Government of the United States and Texas | (3-0) | 3 | |
| **History** | | | 6 |
| History 105<br>History of the United States | (3-0) | 3 | |
| History 106<br>History of the United States | (3-0) | 3 | |
| **Mathematics** | | | 6 |
| Mathematics 102<br>Algebra | (3-0) | 3 | |
| Mathematics 103<br>Plane Trigonometry | (3-0) | 3 | |
| **Public Speaking** | | | 1 |
| English 401<br>Public Speaking | (0-2) | 1 | |
| **Sociology** | | | 3 |
| Sociology (elective)<br>(Sociology 315 not acceptable) | | 3 | |

| TECHNICAL | | | |
|---|---|---|---|
| **Engineering Drawing** | | | 4 |
| Engineering Graphics 105<br>Engineering Drawing | (0-6) | 2 | |
| Engineering Graphics 106<br>Descriptive Geometry | (0-6) | 2 | |

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*Students who do not have credit for Basic ROTC must take Government 306 and 307 in place of Government 305.

| | | | |
|---|---|---|---|
| **Engineering Problems** | | | 1 |
| Mechanical Engineering 101<br>Engineering Problems | (0-3) | 1 | |
| **Shop Work**<br>Includes credit for industrial work experience | | | 24 |

## SCIENCE

| | | | |
|---|---|---|---|
| **Chemistry** | | | 4 |
| Chemistry 106<br>General Chemistry | (3-3) | 4 | |
| **Industrial Supervision or Management** | | | 3 |
| Industrial Education 429<br>Foremanship and Supervision | (3-0) | 3 | |
| Or | | | |
| Industrial Engineering 401<br>Survey of Industrial Engineering | (3-0) | 3 | |
| **Modern Industries** | | | 3 |
| Industrial Education 308<br>A Study of Modern Industries | (3-0) | 3 | |
| **Physics** | | | 8 |
| Physics 201<br>College Physics | (3-3) | 4 | |
| Physics 202<br>College Physics | (3-3) | 4 | |

## MILITARY TRAINING

| | | | |
|---|---|---|---|
| **Military or Air Science** | | | 4 |

## PROFESSIONAL EDUCATION

The courses listed below are the basic ones required by the Vocational Division of the Texas Education Agency for a vocational certificate.

| | | | |
|---|---|---|---|
| **General Requirements** | | | 9 |
| Industrial Education 204<br>Development and Practice in Industrial Education | (3-0) | 3 | |
| Industrial Education 301<br>Methods of Teaching and Class Management | (2-0) | 2 | |
| Industrial Education 310<br>Course Making | (2-0) | 2 | |
| Industrial Education 424<br>Organization of Instructional Material | (1-2) | 2 | |

Additional courses and related fields are listed below depending upon the certificate desired.

| | | | |
|---|---|---|---|
| **For Vocational Industrial Shop Teachers**<br>Visual Aids for Industrial Subjects<br>Methods of Introducing Industrial Organization and Management into Industrial Schools | | 6 | |
| Or | | | 6 |
| **For Part-Time Cooperative Training Coordinators**<br>Follow-up, Visitation, and Coordination in Part-Time Schools<br>Related subjects in part-time cooperative programs | | 6 | |
| **Supervised Teaching** | | | 6 |
| **Other general education courses suited to the needs of the student** | | | 8 |

## ELECTIVE

| | | | |
|---|---|---|---|
| **To be approved by the Head of the Department** | | | 30 |
| | **TOTAL CREDITS** | | **145** |

## Curriculum in
## INDUSTRIAL EDUCATION

### Industrial Technology and Industrial Distribution Option

### FRESHMAN YEAR

| First Semester | | Credit |
|---|---|---|
| **Engineering Graphics 105**<br>Engineering Drawing | (0-6) | 2 |
| **English 103**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 |
| **Industrial Education 105**<br>Wood Craft | (1-5) | 3 |
| **Industrial Education 107**<br>Industrial Matherials and Manufacturing Processes | (2-3) | 3 |
| **Mathematics 102**<br>Algebra | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 101** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 106**<br>General Chemistry | (3-3) | 4 |
| **Engineering Graphics 106**<br>Descriptive Geometry | (0-6) | 2 |
| **English 104**<br>Composition and Rhetoric | (3-0) | 3 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 116**<br>Plane Trigonometry and Analytic Geometry | (4-0) | 4 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physical Education 102** | (0-2) | R |
| | | 18 |

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 223**<br>Differential and Integral Calculus | (4-0) | 4 |
| **Mechanical Engineering 101**<br>Engineering Problems | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 201**<br>College Physics | (3-3) | 4 |
| **Elective** | | 3 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| | | |
|---|---|---|
| **Engineering Graphics 127**<br>Industrial Freehand Sketching | (1-3) | 2 |
| **English 210**<br>Introduction to Logical Discourse | (2–0) | 2 |
| **Health Education 216**<br>First Aid | (0-3) | 1 |
| **Industrial Education 106**<br>Sheet Metal | (1-5) | 3 |
| **Industrial Education 204**<br>Development and Practice in Industrial Education | (3-0) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 202**<br>College Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 17 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Architecture 331**<br>Mechanics and Materials | (2-3) | 3 |
| **Industrial Education 308**<br>A Study of Modern Industries | (3-0) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Elective** | | 7 |
| | | 19 |

| | | |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Education 304**<br>Applied Industrial Electricity | (2-3) | 3 |
| **Industrial Education 326**<br>General Metalwork | (1-5) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| **Elective** | | 4 |
| | | 18 |

## SENIOR YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 | **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Industrial Education 429**<br>Foremanship and Supervision | (3-0) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Industrial Education 447**<br>Electricity and Electronics | (2-3) | 3 | **Industrial Education 481**<br>Seminar in Industrial Education | (1-0) | 1 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 | **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Elective** | | 7 | **Elective** | | 8 |
| | | 18 | | | 18 |

NOTE: INDUSTRIAL TECHNOLOGY. Students pursuing this option **must** include the following courses as part of the elective requirement:

| | | | | | |
|---|---|---|---|---|---|
| **Industrial Education 423**<br>Analysis Procedure | (1-2) | 2 | **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Industrial Education 438**<br>Industrial Safety | (2-3) | 3 | **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |

INDUSTRIAL DISTRIBUTION. Students interested in Industrial Distribution **must** include the following courses as part of the elective requirement:

| | | | | | |
|---|---|---|---|---|---|
| **Business Administration 205**<br>Marketing | (3-0) | 3 | **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 318**<br>Wholesale Merchandising | (3-0) | 3 | **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |

## ELECTIVES FOR INDUSTRIAL EDUCATION

Electives for all options in industrial education are to be selected from the general engineering electives shown on page 211 from the sophomore, junior, or senior courses offered by the Department of Engineering Graphics or from the following:

| | | |
|---|---|---|
| **Chemistry 102**<br>General Chemistry | (3-3) | 4 |
| **Civil Engineering 201**<br>Plane Surveying | (3-3) | 4 |
| **Civil Engineering 202**<br>Advanced Surveying | (2-3) | 3 |
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Civil Engineering 300**<br>Summer Surveying Practice | | 5 |
| **Education 426**<br>Tests and Measurements | (3-0) | 3 |
| **Education 427**<br>Principles of Guidance | (3-0) | 3 |
| **Geology 205**<br>Elementary Geology | (3-3) | 4 |
| **Industrial Education 427**<br>Driver Education | (1-6) | 3 |
| **Journalism 205**<br>Principles of Typography | (2-3) | 3 |
| **Journalism 315**<br>Photography | (1-3) | 2 |
| **Mathematics 104**<br>Analytic Geometry | (3-0) | 3 |
| **Mathematics 209**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Physical Education 221**<br>Safety Education | (2-0) | 2 |
| **Psychology 207**<br>General Psychology | (3-0) | 3 |
| **Psychology 305**<br>Personality Adjustments | (3-0) | 3 |
| **Psychology 323**<br>Psychology of Adolescence | (3-0) | 3 |
| **Sociology 304**<br>Criminology and<br>Juvenile Delinquency | (3-0) | 3 |
| **Sociology 315**<br>The Family | (3-0) | 3 |
| **Sociology 408**<br>Organization for Boy Scout Work | (2-0) | 2 |

Additional electives for the teacher education options may be selected from required courses for the industrial technology option, from the junior or senior courses offered by the Department of Education and Psychology, or from the following courses:

| | | |
|---|---|---|
| **Physical Education 253**<br>Coaching of Baseball | (1-3) | 2 |
| **Physical Education 315**<br>Elementary School Physical Education | (3-0) | 3 |
| **Physical Education 317**<br>Coaching of Football | (1-3) | 2 |

Additional electives for the industrial technology and industrial distribution option may be selected from the required courses for the industrial arts teacher education option or from the following courses:

| | | |
|---|---|---|
| **Business Administration 208**<br>Advertising | (3-0) | 3 |
| **Business Administration 315**<br>Insurance | (3-0) | 3 |
| **Business Administration 324**<br>Casualty Insurance and Suretyship | (3-0) | 3 |
| **Business Administration 436**<br>Sales Management | (3-0) | 3 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 |
| **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Journalism 308**<br>Newspaper Advertising | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |

Those desiring to elect courses not listed above must secure the written approval of the Head of the Department of Industrial Education and of the Dean of the School of Engineering.

## Curriculum in
## INDUSTRIAL ENGINEERING

### FRESHMAN YEAR
(See page 188)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Industrial Engineering 202**<br>Introduction to Industrial Engineering | (2-0) | 2 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 19 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Industrial Engineering 302**<br>Production Engineering | (1-2) | 2 |
| **Industrial Engineering 414**<br>Statistical Control of Quality | (2-3) | 3 |
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Mechanical Engineering 337**<br>Kinematic Drawing | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Business Administration 430**<br>Cost Accounting Survey | (3-0) | 3 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-2) | 1 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Industrial Engineering 404**<br>Motion and Time Study | (2-3) | 3 |
| **Industrial Engineering 420**<br>Manufacturing Costs | (3-0) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **Industrial Engineering 415**<br>Production Control | (1-3) | 2 |
| **Industrial Engineering 453**<br>Tool Engineering | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Technical Elective** | | 2 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | |
| **Or** | | 3 or 4 |
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | |
| **Industrial Engineering 412**<br>Labor and Industry | (3-0) | 3 |
| **Industrial Engineering 416**<br>Factory Layout | (1-6) | 3 |
| **Industrial Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 |
| **Elective (Humanities)** | | 3 |
| | | 16 or 17 |

## Technical Electives for
## INDUSTRIAL ENGINEERING

The student should observe that these electives may be used for obtaining a better background in statistics, accounting, or economics. Some technical subjects are available for those so inclined.

| | | |
|---|---|---|
| **Business Administration 303**<br>Statistical Method | (3-3) | 4 |
| **Business Administration 304**<br>Business Cycles and<br>Business Measurements | (3-0) | 3 |
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Business Administration 316**<br>Office Management | (2-0) | 2 |
| **Business Administration 337**<br>Data Processing | (2-2) | 3 |
| **Business Administration 418**<br>Corporation Finance | (3-0) | 3 |
| **Business Administration 420**<br>Principles of Investment | (3-0) | 3 |
| **Business Administration 435**<br>Salesmanship | (3-0) | 3 |
| **Business Administration 446**<br>Marketing Industrial Products | (2-0) | 2 |
| **Business Administration 463**<br>Employee Supervision | (2-0) | 2 |
| **Economics 311**<br>Money and Banking | (3-0) | 3 |
| **Economics 318**<br>Economics of Labor | (3-0) | 3 |
| **Economics 437**<br>Government and Labor Relations | (2-0) | 2 |
| **Electrical Engineering 325**<br>Electronics | (3-0) | 3 |
| **Electrical Engineering 331**<br>Theory and Application<br>of Electron Tubes | (3-3) | 4 |
| **Electrical Engineering 420**<br>Servomechanisms and<br>Control Devices | (3-0) | 3 |
| **Engineering Graphics 209**<br>Nomography | (2-0) | 2 |
| **Genetics 406**<br>Statistics | (2-2) | 3 |
| **Industrial Education 328**<br>Industrial Accident Prevention | (3-0) | 3 |
| **Industrial Engineering 410**<br>Current Practices in<br>Industrial Engineering | | 3 |
| **Industrial Engineering 411**<br>Wage and Salary Control | (3-0) | 3 |
| **Industrial Engineering 485**<br>Special Problems in<br>Industrial Engineering | | 1 to 3 |
| **Journalism 321**<br>Industrial Journalism | (2-2) | 3 |
| **Journalism 406**<br>Publicity and Public Relations | (3-0) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mathematics 411**<br>Mathematical Probability | (3-0) | 3 |
| **Mathematics 414**<br>Mathematical Statistics | (3-0) | 3 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| ***Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and<br>Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| **Psychology 401**<br>Industrial Psychology | (3-0) | 3 |

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*May be used for Mechanical Engineering 337 and 2 hours of technical elective.

## Curriculum in MECHANICAL ENGINEERING

(Steam Power, Internal Combustion Engines, Automotive, Refrigeration, Air Conditioning, Physical Metallurgy, Heat Transfer, Vibration, Analysis, and Machine Design)

### FRESHMAN YEAR

(See page 188)

### SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Civil Engineering 206**<br>Plane Surveying | (0-3) | 1 | **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 | **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physical Education 202** | (0-2) | **R** |
| **Physical Education 201** | (0-2) | **R** | | | 18 |
| | | 19 | | | |

### JUNIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 | **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 | **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 | **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 | **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 | **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| | | 17 | | | 17 |

### SENIOR YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 | **Electrical Engineering 331**<br>Theory and Application of Electron Tubes | (3-3) | 4 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 | **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 | **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 | **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 | **Mechanical Engineering 481**<br>Seminar | (0-2) | 1 |
| **Technical Elective** | | 3 | **Technical Elective** | | 3 |
| | | 17 | | | 17 |

## Technical Electives for MECHANICAL ENGINEERING

| | | |
|---|---|---|
| **Industrial Engineering 458**<br>Programming of Digital Computers | (3-2) | 4 |
| **Mathematics 417**<br>Numerical Analysis | (3-3) | 4 |
| **Mechanical Engineering 409**<br>Structure and Properties of Alloys | (2-3) | 3 |
| **Mechanical Engineering 410**<br>Internal Combustion Engines | (3-0) | 3 |
| **Mechanical Engineering 414**<br>Steam and Gas Turbines | (3-0) | 3 |
| **Mechanical Engineering 420**<br>Marine Engineering | (3-0) | 3 |
| **Mechanical Engineering 432**<br>Automotive Engineering | (3-0) | 3 |
| **Mechanical Engineering 436**<br>Air Conditioning and Refrigeration | (3-0) | 3 |
| **Mechanical Engineering 457**<br>Engineering Analysis | (3-0) | 3 |
| **Mechanical Engineering 485**<br>Advanced Problems in Mechanical Engineering | | 2 to 5 |
| **Nuclear Engineering 401**<br>Nuclear Engineering | (3-0) | 3 |

## Four-Year Curriculum in PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

### FRESHMAN YEAR

(See page 188)

### SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 6 |
| | | 17 |

## Five-Year Curriculum in
## PETROLEUM ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

### FRESHMAN YEAR
(See page 188)

### SOPHOMORE YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 20 |

| | | |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

### JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Civil Engineering 315**<br>Strength of Materials Laboratory | (0-3) | 1 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 210**<br>Introduction to Logical Discourse | (2-0) | 2 |
| **English 403**<br>Speaking for Professional Men | (1-2) | 2 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **History 315**<br>The United States, 1901 to the Present | (3-0) | 3 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| | | 17 |

## SENIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Business Administration 305**<br>Business Law | (3-0) | 3 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 301**<br>Writing for Professional Men | (3-0) | 3 |
| **English 320**<br>Selected Reading | (1-0) | 1 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| **Elective (Humanities)** | (4-0) | 4 |
| | | 16 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

### For the class graduating in 1961-62

## FIFTH YEAR

| | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Psychology 303**<br>Psychology for Technical Students | (3-0) | 3 |
| ***Technical Elective** | | 1 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

### Five-Year Curriculum in
## PETROLEUM ENGINEERING— GEOLOGICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

## FRESHMAN YEAR

(See page 188)

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*To be chosen from Petroleum Engineering 416 or 419.

## SOPHOMORE YEAR

| First Semester | | Credit |
|---|---|---|
| **English 231 or 232**<br>Survey of English Literature | (3-0) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 |
| **Geology 203**<br>Crystallography and Mineralogy | (2-6) | 4 |
| **Geology 209**<br>Introduction to Field Work | (0-3) | 1 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 204**<br>Mineralogy and Rock Study | (1-3) | 2 |
| **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **History 106**<br>History of the United States | (3-0) | 3 |
| **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 |
| **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 202** | (0-2) | R |
| | | 20 |

## SUMMER CAMP
### (Optional)
Geology 299, Field Geology, credit 2

## JUNIOR YEAR

| | | |
|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 |
| **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 303**<br>Petrography and Petrology | (2-3) | 3 |
| **Geology 305**<br>Invertebrate Paleontology | (3-3) | 4 |
| **Geology 315**<br>Principles of Sedimentation | (2-3) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 |
| | | 17 |

| | | |
|---|---|---|
| **Geology 306**<br>Stratigraphy | (3-3) | 4 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Mechanical Engineering 323**<br>Thermodynamics | (4-0) | 4 |
| **Elective (Humanities)** | | 3 |
| | | 17 |

## SUMMER CAMP
Geology 300, Field Geology, credit 6

## SENIOR YEAR

| | | |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **Geophysics 435**<br>Principles of Geophysical Exploration | (3-3) | 4 |
| **Mechanical Engineering 346**<br>Fluid Mechanics and Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **Economics 203**<br>Principles of Economics | (3-0) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology or Geophysics Elective*** | | 3 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 17 |

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*To be selected from: Geology 304, 409, 423, 443; Geophysics 436, 446.

## FIFTH YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| **Electrical Engineering 305**<br>Electrical Circuits and Machines | (3-3) | 4 | **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology or Geophysics Elective*** | | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **Government 306**<br>American National Government | (3-0) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | | | 16 |
| | | 19 | | | |

### For class graduating in 1961-62

## SUMMER CAMP

Geology 300, Field Geology, credit 6

## FIFTH YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Geology 404**<br>Geology of Petroleum | (2-3) | 3 | **Geology 425**<br>Subsurface Geology | (2-3) | 3 |
| **Geology 481**<br>Seminar | (1-0) | 1 | **Geology 433**<br>Field Geology | (0-6) | 2 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 | **Geology 482**<br>Seminar | (1-0) | 1 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 | **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 | **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 | **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 | **Elective** | | 6 |
| **Elective** | | 3 | | | 19 |
| | | 18 | | | |

### Five-Year Curriculum in
## PETROLEUM ENGINEERING—MECHANICAL ENGINEERING

(A minimum of six weeks of approved experience in oil field operations or Petroleum Engineering 300 required for registration in senior Petroleum Engineering courses)

## FRESHMAN YEAR

(See page 188)

## SOPHOMORE YEAR

| | | | | | |
|---|---|---|---|---|---|
| **Chemistry 225**<br>Elementary Organic Chemistry | (2-0) | 2 | **Chemistry 207**<br>Elementary Quantitative Analysis | (2-3) | 3 |
| **Geology 201**<br>General Geology | (3-0) | 3 | **Civil Engineering 208**<br>Topographic Surveying | (1-3) | 2 |
| **Geology 207**<br>Mineralogy and Rock Study | (2-6) | 4 | **Geology 210**<br>Historical Geology | (3-3) | 4 |
| **Mathematics 210**<br>Calculus | (3-0) | 3 | **Mathematics 307**<br>Calculus | (3-0) | 3 |
| **Mechanical Engineering 212**<br>Engineering Mechanics | (3-0) | 3 | **Mechanical Engineering 313**<br>Engineering Mechanics | (3-0) | 3 |
| **Military or Air Science** | (0-3) | 1 | **Military or Air Science** | (0-3) | 1 |
| **Physics 219**<br>Sound, Light, Electricity | (3-3) | 4 | **Physics 220**<br>Modern Physics | (3-3) | 4 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 20 | | | 20 |

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*To be selected from: Geology 304, 409, 423, 425, 443; Geophysics 436, 446.

## SUMMER SESSION

| First Term | | |
|---|---|---|
| **Economics 203**<br>Principles of Economics | (9-0) | 3 |
| **History 106**<br>History of the United States | (9-0) | 3 |
| | | 6 |

| Second Term | | |
|---|---|---|
| **Geography 401**<br>International Political Geography | (9-0) | 3 |
| **Government 306**<br>American National Government | (9-0) | 3 |
| | | 6 |

## JUNIOR YEAR

| First Semester | | Credit |
|---|---|---|
| **Chemistry 323**<br>Physical Chemistry | (3-3) | 4 |
| **Civil Engineering 305**<br>Mechanics of Materials | (3-0) | 3 |
| **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **Mathematics 308**<br>Differential Equations | (3-0) | 3 |
| **Mechanical Engineering 201**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 309**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 327**<br>Thermodynamics | (3-0) | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Chemistry 324**<br>Physical Chemistry | (3-3) | 4 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 |
| **Mechanical Engineering 202**<br>Manufacturing Processes | (0-3) | 1 |
| **Mechanical Engineering 310**<br>Machine Production Techniques | (0-3) | 1 |
| **Mechanical Engineering 328**<br>Thermodynamics | (3-0) | 3 |
| **Mechanical Engineering 338**<br>Kinematics and Machine Design | (2-3) | 3 |
| **Mechanical Engineering 340**<br>Physical Metallurgy | (2-3) | 3 |
| | | 17 |

## SENIOR YEAR

| | | |
|---|---|---|
| **Electrical Engineering 307**<br>Electrical Circuits | (3-3) | 4 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Geology 312**<br>Structural Geology | (2-3) | 3 |
| **Industrial Engineering 401**<br>Survey of Industrial Engineering | (3-0) | 3 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 305**<br>Petroleum Development | (2-0) | 2 |
| **Petroleum Engineering 307**<br>Petroleum Development Laboratory | (0-3) | 1 |
| | | 17 |

| | | |
|---|---|---|
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **Mechanical Engineering 344**<br>Fluid Mechanics | (3-0) | 3 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Mechanical Engineering 482**<br>Seminar | (0-2) | 1 |
| **Petroleum Engineering 306**<br>Reservoir Rock Properties | (2-0) | 2 |
| **Petroleum Engineering 308**<br>Rock and Fluid Properties Laboratory | (0-3) | 1 |
| **Petroleum Engineering 310**<br>Reservoir Fluids | (2-0) | 2 |
| **Petroleum Engineering 312**<br>Well Logging | (1-0) | 1 |
| | | 16 |

## FIFTH YEAR

| | | |
|---|---|---|
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 461**<br>Heat Transfer | (3-0) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (3-0) | 3 |
| **Mechanical Engineering 459**<br>Mechanical Vibration | (3-0) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| ***Technical Elective** | | 3 |
| | | 18 |

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*From Mechanical Engineering Approved List.

## For the class graduating in 1961-62

### FIFTH YEAR

| First Semester | | Credit |
|---|---|---|
| **Mechanical Engineering 403**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 417**<br>Power Engineering | (4-0) | 4 |
| **Mechanical Engineering 445**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 405**<br>Drilling and Production Design | (2-2) | 3 |
| **Petroleum Engineering 409**<br>Subsurface Engineering | (1-3) | 2 |
| **Petroleum Engineering 413**<br>Petroleum Measurement and Transportation | (2-2) | 3 |
| **Petroleum Engineering 415**<br>Measurements Laboratory | (0-3) | 1 |
| **Petroleum Engineering 428**<br>Reservoir Engineering | (2-0) | 2 |
| | | 20 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 409**<br>Survey of Accounting Principles | (3-0) | 3 |
| **Electrical Engineering 308**<br>Electrical Machinery | (2-3) | 3 |
| **English 401**<br>Public Speaking | (0-2) | 1 |
| **Mechanical Engineering 404**<br>Engineering Laboratory | (1-3) | 2 |
| **Mechanical Engineering 446**<br>Machine Design | (2-3) | 3 |
| **Petroleum Engineering 402**<br>Petroleum Property Management | (3-0) | 3 |
| **Petroleum Engineering 414**<br>Petroleum Production Engineering | (2-0) | 2 |
| **Petroleum Engineering 438**<br>Reservoir Engineering | (2-0) | 2 |
| | | 19 |

## General Electives in ENGINEERING

Students with the proper prerequisites may choose their general electives from the list below. Other courses are available to the student upon recommendation of department heads and the approval of the Dean of Engineering.

### I. Humanistic—Social

1. Architecture 339, 340, 439, 440; English 212, 231, 232, 315, 316, 321, 322, 327, 328, 334, 336, 340, 350, 371, 375; Geography 204, 312, 401; Liberal Arts 201, 301, 304; Psychology 207, 301, 303, 305, 401, 403; Sociology 205, 206, 311, 314, 315, 320, 412, 418.
2. Economics: Any course offered by the Department.
3. History and Government: Any junior or senior course offered by the Department.
4. Modern Languages: Any course offered by the Department.
5. Religious Education: Any course, but not more than 4 semester hours may be counted.

### II. Others

1. Civil Engineering 406, 408, 435, 448, 457, 473; Electrical Engineering 331, 457; Engineering Graphics 221; English 301, 309; Geology 201, 205; Health Education 216; Industrial Education 328, 429; Industrial Engineering 401, 411, 412, 414, 458; Journalism 304, 311, 315, 321, 406; Landscape Architecture 408; Oceanography 401; Physical Education 210, 221.
2. Biology: Any course, but not more than 7 hours of freshman courses.
3. Business Administration: Any sophomore, junior, or senior course offered by the Division.
4. Chemistry: Any sophomore, junior, or senior course offered by the Department.

5. Mathematics: Any junior or senior course offered by the Department.
6. Nuclear Engineering: Any course offered by the Department.
7. Physics: Any junior or senior course offered by the Department.

Certain courses from the above list are acceptable to the Air Science and Military Science Departments in partial fulfillment of the R.O.T.C. requirements.

# THE SCHOOL OF MILITARY SCIENCES

The participation of our government in foreign affairs makes it apparent that every young American must recognize his obligation for service to his country and should realize the necessity for coordination of his military and civilian careers. The Army and Air Force at the Agricultural and Mechanical College of Texas offer ROTC courses which supplement the student's civilian curriculum and offer him the opportunity of planning his civilian and military careers on a mutually supporting basis.

In the words of General Eisenhower, "ROTC is a ready-made course, designed and perfected to develop the qualities of leadership required in both military and civil enterprise."

## AIR SCIENCE

The Air Force ROTC program is designed to develop qualities of leadership, character, and citizenship, and to prepare selected college students to be commissioned officers in the United States Air Force. The first Air Force (then Air Service) ROTC units were established in 1920 at the Universities of California and Illinois, at Massachusetts Institute of Technology, and at the Agricultural and Mechanical College of Texas. Today the program includes over 100,000 students at approximately 175 colleges and universities.

The Air Force ROTC program, called Air Science, is divided into two parts. The first two years constitute the basic course and the second two years constitute the advanced course. Successful completion of the advanced course is a prerequisite for commissioning. The objective of the basic course is to acquaint students with the air power concept as well as to prepare them for the advanced course. However, since not all cadets will qualify for entry into the advanced course, the emphasis in the basic course is on air age citizenship and is intended to help all young men face the challenge of the Aerospace Age.

Cadets in the basic course spend two hours a week in the classroom and one hour in a leadership laboratory. The first year is a survey of the various elements of air power, basic aeronautical science, and the organization and operation of the military arm of the Federal Government. The second year consists of a survey of the development of aerial warfare with emphasis on principles of war, concepts of employment of forces, and changing weapons systems, bases, material, personnel, and operations. The problems and possibilities of operating in space are also covered. Students enrolled in the basic course are deferred from draft by Selective Service. The Air Force reimburses the College for furnishing students with uniforms and textbooks.

Leadership training is continuous during the student's life as an Air Force ROTC cadet. Classroom instruction and the leadership laboratory are both designed to develop to the maximum each cadet's leadership potential and his knowledge of military fundamentals. Instruction in military courtesy and discipline will be of value in any walk of life. The common courtesies, respect for authority, and intelligent leadership demanded by the Air Force are the same qualities needed for success in civilian life. In this program the cadet has an opportunity to apply principles of leadership, management, and staff work in actual working situations.

Cadets apply for enrollment in the advanced course during their second year of basic Air Science. Those who apply are given a physical examination and take the Air Force Officer Qualification Test. Enrollment in the advanced course is carefully limited to students of high moral character who are physically qualified, who possess the necessary interest, intelligence, and aptitude, who have demonstrated leadership potential, and who are well qualified academically. For enrollment in the advanced course, the cadet must have proven himself diligent and successful in his regular studies and not just in his Air Force ROTC courses. Academic excellence is strongly encouraged. The purpose of this program is to supplement the student's regular academic work with a program of education and training that will prepare him to accept and discharge the responsibilities of leadership that are inherent in commissioned officer positions. Graduation and a degree are prerequisites to a commission but the bare minimum is not acceptable. An advanced course cadet is a member of a select group.

The curriculum of the advanced course is the same for all cadets. The first year of the advanced course is a study of the principles of leadership and management as they apply to Air Force problems and tasks. Included are Air Force leadership doctrine, major socio-psychological principles of leadership, a consideration of the leader-follower relationship in an Air Force environment, and communication theory relevant to leadership. During the summer between the first and second years of the advanced course, the cadet attends a four-week summer camp on an Air Force base. Here during a period of intense training under close supervision, he sees the Air Force in operation and becomes familiar with its equipment, procedures, and systems. The second year of the advanced course is a study of global relationship of special concern to the Air Force officer with attention to such aspects as weather, navigation, world political geography, and international relations.

With the approval of the Air Force and the College, certain college courses have been substituted recently for Air Science courses with similar objectives. These courses are: English 210, Introduction to Logical Discourse; English 401 (or 403), Public Speaking; History 318, International Developments since 1918; and Geography 401, International Political Geography. As a result, the advanced course Air Force ROTC student has extra time available to further his study in his academic major.

During his senior year, a cadet who has applied for Air Force pilot training after graduation is given 36½ hours of flight training in light aircraft and 36½ hours of ground school. Flight training is provided at the College by FAA approved flying school operations and upon successful completion, the student is eligible for a private pilot's license.

If a student applies for the advanced course and is selected for enrollment, he must agree to complete the advanced course, complete the Summer Training Unit during the summer between his junior and senior years, and, upon graduation, accept a commission as an officer in the Air Force Reserve if one is tendered. The foregoing becomes an integral part of his degree requirements from the College. He must also agree to serve on active duty for not less than four years after being commissioned, or, if applying for flight training either as a pilot or as a navigator, must agree to serve on active duty for not less than four years after completion of basic flight training. Advanced course cadets are deferred from draft by Selective Service. They receive approximately $500.00 from the Air Force during their two years in the program. This is in addition to their pay and travel allowances received in connection with their attendance at the Summer Training Unit.

Upon successfully completing the advanced course and graduating from the College, students are commissioned as second lieutenants in the United States Air Force Reserve. Distinguished graduates are eligible to make immediate application for commissions in the Regular Air Force.

The Air Force ROTC program is administered by the Department of Air Science, which is an integral part of the College. All instructors are active duty officers assigned to the College by the United States Air Force. Details on courses offered are set forth under the departmental listing in this catalogue. Information desired may be obtained by writing directly to the Head of the Department of Air Science.

## MILITARY SCIENCE

While the four-year ROTC course normally leads to a reserve commission, the Army relies upon this source for half of the new Regular Army officers appointed each year. The Army program is a general military science curriculum, and under the Distinguished Military Graduate program, interested cadets can apply for and be granted regular commissions upon graduation. Those students selected must be outstanding in military aptitude and academic proficiency. They will be tendered the same type of commission given graduates of the United States Military Academy, West Point, New York. Many A. and M. graduates who received their commissions under this program are now actively pursuing Army careers.

Branch assignments for regular and reserve commissions will be made by the Department of the Army. These branch assignments will be based on the curriculum of the student's major field of study, student preference, leadership, and technical qualifications. Students will select three branches in order of preference. If a student is physically qualified for a commission in the combat branches, one of the three branches selected must be a combat arm.

## THE ARMY COMBAT ARMS

The mission of the entire Army is to support the fighting teams on the battle lines—the men who get there first. These teams are made up of Infantry, Armor, Artillery, Engineers, and Signal Corps.

ARMOR. Armor is the combat arm with characteristics and capabilities especially designed for offensive action. The role of Armor on today's battlefield is the conduct of highly mobile ground warfare, primarily offensive in nature, and characterized by a predominance of mounted combat. Armored units concentrate their firepower at the decisive area of action to lead or accompany Infantry in destroying the enemy. This role is performed by the armored division, armored cavalry regiment, separate armor groups, and the armor elements of infantry and airborne divisions. Officers serving with Armor may anticipate rewarding assignments in these units, which provide valuable experience in working with men, machines, and weapons. Today's modern Armor combines newly acquired mobility, firepower, and shock action with the traditional dash and daring of the old Cavalry to produce a fast, hard-hitting team that truly earns its name as "The Combat Arm of Decision."

ARTILLERY. Artillery is the combat branch which is primarily concerned with the employment and firing of cannon in warfare. Its armament includes many types of guns, howitzers, rockets and guided missiles, all designed to enhance the destructive potential of the army against hostile targets on the ground, in the air, and on the water.

To combat these diversified targets, Artillery is comprised of two general types — Field Artillery and Air Defense Artillery — each type being armed with weapons and equipment commensurate with its combat responsibilities. Many of these weapons deliver an atomic warhead.

With the advent of rockets and guided missiles, an even wider field is being opened for the Artilleryman. Varieties of rockets and guided missiles, such as the Nike and the Redstone, have been developed for the use of the Artillery in coping with the higher speeds and altitudes of modern aircraft and greater ranges to ground targets. The field is open for employment of electronic equipment which will cause rockets to locate and automatically direct themselves to targets at extremely high altitudes, speeds, and ranges.

No special academic course is required for commission in the Artillery, although a demonstrated aptitude for mathematics is desirable.

INFANTRY. Post World War II hostilities have illustrated again that the Infantry officer is the key to success in battle. He is the bulwark of

Americanism whose steadfastness is the true measure of our national security.

As the lives of our fighting men are more highly valued than the equipment of war, competent leadership is imperative. To meet this need, the U. S. Infantry officer has developed throughout our history to his present status of personnel management specialist in addition to his tactical proficiency. He undergoes a career-long balanced program of training that includes fine service schools and the best civilian colleges as well as service in both command and staff capacities. Full utilization of these opportunities, combined with maximum individual effort, results in a well rounded officer capable of effective performance in this most challenging career field.

No special academic course is necessary for commission in the Infantry.

THE CORPS OF ENGINEERS. The Corps of Engineers is both a combat arm and a technical service of the Department of the Army. In addition it has a civil mission. This multiple function presents a challenging and varied career for Engineer officers. Engineer military operation is worldwide, embracing most fields of engineering and construction practices in highly diversified geographical and political areas.

The civil works function of the Corps of Engineers is supervised directly by the Congress of the United States and includes river and harbor developments, flood control, canals, dams, and relief work in disaster areas.

To be commissioned in the Corps of Engineers a student must pursue a course which leads to a degree in engineering, technical or other scientific field.

THE SIGNAL CORPS. The Signal Corps is both a combat arm and a technical service of the Department of the Army. As a combat arm, its mission is to provide the communications network for all military operations from Department of the Army Headquarters to the front lines. This service is performed in peace and in war by the most practical and efficient means consistent with modern developments. As a technical service, its mission is to develop, procure, and maintain equipment used for such fields as electronics, avionics, meteorology, photography, and television. This service includes the engineering, installation, operation, and maintenance of fixed Army communications and training of signal specialists. Signal communications are the nerve system of the Army which enables coordination of effort by all branches.

Signal corps requirements for officers exist in the following fields: Communications, Electronics, and Electrical Engineering; Physics; Mathematics, Meteorology; Automatic Data Processing Systems; Operations Research; Business Administration; Personnel Management; Education; Comptrollership; Motion Picture and Television Production.

## THE TECHNICAL SERVICES

ARMY SECURITY AGENCY. The mission of the Army Security Agency is related to the application of procedures designed to insure smooth functioning of the Army's world-wide electrical communication facilities, and to deny to unauthorized persons access to information which might be detrimental to the national defense. In the United States Army Reserve, there is a separate branch designated the Army Security Reserve even though in the active Army the Army Security Agency is not a branch of the service.

No special academic course is required for a commission in Army Security Agency, though it is desirable that a majority of the personnel have a technical background in such fields as electronics, mathematics, and allied phases of engineering.

THE CHEMICAL CORPS. The Chemical Corps is charged with the investigation, research, design, and development of chemical, biological, and radiological warfare items. It is concerned with smoke and incendiary materials, toxic gases, all war gas defense appliances, and biological warfare and radiological defense activities. It furnishes advice to all elements of the Department of Defense on chemical and biological warfare and radiological defense. It is responsible for the supervision of training of the army in chemical and biological warfare and radiological defense.

To be commissioned in the Chemical Corps, a student must be pursuing a course which leads to a degree in a scientific or engineering field, with preference for the chemical, biological, and mechanical arts and sciences.

THE ORDNANCE CORPS. The Ordnance Corps provides the Armed Forces of our country with material for firepower and mobility—rifles, machine guns, artillery, ammunition, tanks, and trucks. Ordnance material ranges from time pieces to radar controlled automatic antiaircraft guns; from jeeps to ponderous tank transporters; from pistol cartridges to guided missiles.

Ordnance officers perform work closely related with business and industry. They must be businessmen, but the technical nature of Ordnance Corps activites calls for an engineering or scientific background.

To be commissioned in the Ordnance Corps, a student should pursue a course which leads to a degree in engineering, technical, or other scientific fields. However, degrees in business administration and management are often accepted.

THE QUARTERMASTER CORPS. One of the world's largest business organizations, the Quartermaster Corps supplies over 70,000 items to a million men all over the globe; in time of war this may be expanded to 85,000 items to ten million men.

Quartermaster officers of outstanding executive caliber and of potentially sound business sense design, produce, test, and supply clothing for every climate, food for every mealtime situation, and petroleum products for all purposes. These officers are at once merchants, importers, exporters, warehouse managers, purchasing agents, and expediters.

Although no special academic course is required for a commission in the Quartermaster Corps, business administration, personnel management, food technology, and petroleum engineering are recommended educational fields.

THE TRANSPORTATION CORPS. The Transportation Corps performs transportation functions for the Army and provides such transportation service to the Air Force or Navy as may be directed. Transportation officers are the Army's traffic managers as well as highway and railroad executives. The Corps is a major Army user of large transport-type aircraft, both fixed and rotary wing, in the movement of essential supplies in direct support of combat units. It has over-all responsibility for the research, development, and logistical support of Army Aviation. Constant improvement in the movement of men and supplies throughout the world challenges the initiative, leadership, and ingenuity of transportation officers in command or staff capacities, many of which are closely allied with civilian occupations.

Although no special academic course is required for a commission in the Transportation Corps, business administration, economics, and engineering are recommended educational fields.

### THE ADMINISTRATIVE SERVICES

ADJUTANT GENERAL'S CORPS. The Adjutant General's Corps provides military personnel management, Special Services activities, and administrative service for the Army establishment and for other components of the Department of Defense. The qualified Adjutant General's Corps officer is the Army's expert in administrative and personnel matters and is a key member on the Commander's Staff.

No special academic course is required for a commission in the Adjutant General's Corps although business, commerce, and psychology are recommended educational fields.

FINANCE CORPS. The Finance Corps provides finance services for the Army and other components of the Department of Defense. The activities include paying military personnel, allotments for dependents of service personnel, and paying the salaries of civilian personnel of the Army.

No special academic course is required for a commission in the Finance Corps although business and commerce are recommended educational fields.

MILITARY POLICE CORPS. The primary mission of the Military Police Corps is to assist the commander in maintenance of discipline by enforcement of law and order within the military establishment. Thus military policemen will ordinarily be found directing military traffic; patrolling streets in towns where soldiers frequently congregate; investigating crimes committed against individual soldiers, civilians, or the Army; apprehending deserters and personnel absent without leave; maintaining order aboard trains and ships; and providing security for certain types of military operations and installations.

No special academic course is required for a commission in the Military Police Corps.

# THE SCHOOL OF VETERINARY MEDICINE

The principal objective of the School of Veterinary Medicine is to provide complete training in all the phases of veterinary medicine. The degree of Doctor of Veterinary Medicine is conferred upon satisfactory completion of the curriculum in veterinary medicine. By following Curricular Option I, the student may qualify after four years of study for the degree of Bachelor of Science in Animal Science. (See Curricular Options below.)

The School of Veterinary Medicine is composed of the Departments of Veterinary Anatomy, Veterinary Medicine and Surgery, Veterinary Microbiology, Veterinary Parasitology, Veterinary Pathology, Veterinary Physiology and Pharmacology, and Veterinary Public Health. The Department of Veterinary Medicine and Surgery operates the Veterinary Hospital and Ambulatory Clinics. A large proportion of the faculty from all departments is actively engaged in research. In addition to undergraduate instruction, graduate offerings are available leading to the degrees of Master of Science and Doctor of Philosophy.

Training is such that graduates of the School of Veterinary Medicine are well qualified to deal with problems of disease and disease prevention in domestic farm animals, poultry, pet animals, zoo animals, fur-bearing animals, and wild life. Graduates also are well qualified to administer and advise in the public health problems arising from intertransmission of diseases between man and the lower animals. Instruction and practical training are given in milk and meat hygiene and in the inspection of food processing plants. The School is accredited by the Council on Education of the American Veterinary Medical Association.

## PRE-VETERINARY MEDICINE

The following pre-veterinary curriculum is designed to afford the student the best possible preparation for veterinary training. Courses marked with asterisks are requirements. Substitutions for other courses may be made only with the permission of the Dean of the School of Veterinary Medicine.

## Curriculum in PRE-VETERINARY MEDICINE

### FRESHMAN YEAR

| First Semester | Credit | | Second Semester | Credit | |
|---|---|---|---|---|---|
| **Animal Husbandry 107**<br>General Animal Husbandry | **(2-3)** | **3** | ***Biology 101**<br>General Botany of Seed Plants | **(2-3)** | **3** |
| ***Biology 107**<br>Vertebrate Zoology | **(2-3)** | **3** | ***Biology 108**<br>Invertebrate Zoology | **(2-3)** | **3** |
| ***Chemistry 101**<br>General Chemistry | **(3-3)** | **4** | ***Chemistry 102**<br>General Chemistry | **(3-3)** | **4** |
| ***English 103**<br>Composition and Rhetoric | **(3-0)** | **3** | ***English 104**<br>Composition and Rhetoric | **(3-0)** | **3** |
| ***Mathematics 102**<br>Algebra | **(3-0)** | **3** | ***Mathematics 103**<br>Plane Trigonometry | **(3-0)** | **3** |
| **Military or Air Science** | **(0-3)** | **1** | **Military or Air Science** | **(0-3)** | **1** |
| **Physical Education 101** | **(0-2)** | **R** | **Physical Education 102** | **(0-2)** | **R** |
| | | **17** | | | **17** |

NOTE: All students must complete Entomology 208 or its equivalent before the second year in Veterinary School.

## SOPHOMORE YEAR

| First Semester | | Credit | Second Semester | | Credit |
|---|---|---|---|---|---|
| ***Chemistry 227**<br>Organic Chemistry | (3-3) | 4 | ***Chemistry 228**<br>Organic Chemistry | (3-3) | 4 |
| **Dairy Science 202**<br>Dairying | (2-2) | 3 | **English 203**<br>Introduction to Literature | (2-0) | 2 |
| **English 207**<br>Report Writing and Correspondence | (2-0) | 2 | **Entomology 208**<br>Veterinary Entomology | (2-3) | 3 |
| **Government 306**<br>American National Government | (3-0) | 3 | **History 106**<br>History of the United States | (3-0) | 3 |
| **History 105**<br>History of the United States | (3-0) | 3 | **Military or Air Science** | (0-3) | 1 |
| **Military or Air Science** | (0-3) | 1 | ***Physics 216**<br>Introductory Physics | (2-3) | 3 |
| ***Physics 215**<br>Introductory Physics | (2-3) | 3 | **Poultry Science 201**<br>Poultry Production | (2-2) | 3 |
| **Physical Education 201** | (0-2) | R | **Physical Education 202** | (0-2) | R |
| | | 19 | | | 19 |

Substantially the same pre-veterinary curriculum as that outlined above should be completed by students expecting to qualify for admission to the School of Veterinary Medicine in the minimum time (two college academic years). However, a student with a Bachelor of Science degree may be admitted to the professional curriculum with certain pre-veterinary deficiencies. The Dean of the School of Veterinary Medicine shall be the authority on these matters. Completion of any pre-veterinary deficiencies may be required after enrollment in the professional curriculum.

## ENTRANCE REQUIREMENTS TO PROFESSIONAL CURRICULUM

Admission to the professional curriculum in veterinary medicine is granted only for the beginning of the fall semester. Formal application must be filed with the Director of Admissions and Registrar between March 1 and May 1 of the year for which admission is sought. Accompanying the application form must be: complete academic records, including the preparatory record and college record; a record of courses in progress; and a statement showing the applicant to be in good standing.

Minimum pre-veterinary requirements are 70 semester hours including:

| | |
|---|---|
| English composition and rhetoric | 6 hours |
| Biology (at least 4 hours must be zoology) | 8 hours |
| Inorganic chemistry | 8 hours |
| Mathematics | 6 hours |
| Organic chemistry | 8 hours |
| Physics | 6 hours |

Completion of the pre-veterinary requirements with satisfactory grades is a prerequisite for admission to the first year of the professional curriculum in veterinary medicine or to the veterinary courses of that year.

## LIMITED ENROLLMENT

Enrollment in the first year of the professional curriculum in veterinary medicine is limited by facilities of the College to a definite number each year. Selection within this quota is based on scholastic record and professional aptitude, and admission to the curriculum in pre-veterinary medicine does not carry assurance that the student will be admitted to the first year in veterinary medicine.

Limited enrollment in the professional veterinary curriculum has resulted in the establishment of priority groups for applicants by states of residence as follows:

1. First consideration is given to qualified applicants who are residents of Texas and states with which Texas has a contract through the Southern Regional Education Board up to the limit of the quota.

2. If the quota is not filled from priority group 1, a second group of qualified applicants from states of the United States which have no schools of veterinary medicine will be considered.
3. If the quota is not filled from priority groups 1 and 2, a third group of qualified applicants will be considered from other states of the United States which have schools of veterinary medicine.
4. An exceptional candidate from any state will be considered.

## CURRICULAR OPTIONS

Three curricular options are open to students planning to study veterinary medicine.

### Option I

Students may qualify for the degree of Bachelor of Science in Animal Science, to be conferred after four years of study. Under this option the recommended pre-veterinary curriculum and the regular veterinary curriculum are followed. Elective requirements must be met by completing the following courses:

Agronomy 301; Economics 203; English 403; and Genetics 406.

Substitutions for any of the courses required for this Animal Science degree may be made only with approval of the Director of Agricultural Instruction.

### Option II

Students may qualify for a Reserve Officer's commission by scheduling advanced military or air science as electives in the first and second years of veterinary medicine. The number who are permitted to follow this option will necessarily be contingent upon the number of advanced ROTC contracts available.

### Option III

Students who do not wish to qualify either for a Reserve Officer's commission or for the Bachelor of Science degree may register for electives of their own choosing, subject to approval by the Dean of the School of Veterinary Medicine.

Wherever possible, the student should choose his option early in the pre-veterinary curriculum.

## ADMISSION TO THE THIRD YEAR OF VETERINARY MEDICINE

Regardless of the option chosen, a student may not be permitted to register for the third year of veterinary medicine unless he has completed, with an average grade of C or better, all work taken in the first two years of the veterinary curriculum.

## READMISSION

A veterinary student who voluntarily withdraws from the College, or who is dropped from the rolls of the College for cause, forfeits his standing and must apply for readmission. A student who fails any of his veterinary courses may be required to withdraw from the School of Veterinary Medicine.

## ELECTIVES

Students in the School of Veterinary Medicine who do not enroll in advanced ROTC must complete English 403 (Speaking for Professional Men). The remaining 10 credit hours of elective courses must be chosen with the approval of the Dean of the School of Veterinary Medicine.

## Curriculum in
## VETERINARY MEDICINE

### FIRST YEAR

| First Semester | | Credit |
|---|---|---|
| **Biochemistry and Nutrition 312**<br>Veterinary Physiological Chemistry | (3-6) | 5 |
| **Genetics 301**<br>Genetics | (3-2) | 4 |
| **Veterinary Anatomy 301**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 303**<br>Histology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| Second Semester | | Credit |
|---|---|---|
| **Animal Husbandry 320**<br>Animal Nutrition and Feeding | (3-0) | 3 |
| **Veterinary Anatomy 302**<br>Anatomy | (0-9) | 3 |
| **Veterinary Anatomy 304**<br>Embryology | (3-3) | 4 |
| **Veterinary Anatomy 306**<br>Neuroanatomy | (0-6) | 2 |
| **Veterinary Physiology and Pharmacology 326**<br>Physiology | (4-3) | 5 |
| **Elective** | | 3 |
| | | 20 |

### SECOND YEAR

| | | |
|---|---|---|
| **Veterinary Microbiology 435**<br>Microbiology and Immunology | (3-4) | 4 |
| **Veterinary Parasitology 483**<br>Parasites of Domestic Animals | (2-2) | 3 |
| **Veterinary Pathology 443**<br>General Pathology | (4-3) | 5 |
| **Veterinary Physiology and Pharmacology 427**<br>Physiology | (2-6) | 4 |
| **Elective** | | 3 |
| | | 19 |

| | | |
|---|---|---|
| **Veterinary Medicine and Surgery 416**<br>General Surgery | (1-0) | 1 |
| **Veterinary Microbiology 436**<br>Pathogenic Microbiology | (3-3) | 4 |
| **Veterinary Parasitology 484**<br>Parasites of Domestic Animals | (2-2) | 3 |
| **Veterinary Pathology 444**<br>Special Pathology | (5-3) | 6 |
| **Veterinary Physiology and Pharmacology 428**<br>Pharmacology | (3-0) | 3 |
| **Elective** | | 3 |
| | | 20 |

### THIRD YEAR

| | | |
|---|---|---|
| **Veterinary Anatomy 501**<br>Surgical Anatomy | (0-6) | 2 |
| **Veterinary Medicine and Surgery 511**<br>Non-Infectious Diseases of Large Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 513**<br>Non-Infectious Diseases of Small Animals | (3-0) | 3 |
| **Veterinary Medicine and Surgery 515**<br>General Surgery | (4-0) | 4 |
| **Veterinary Medicine and Surgery 519**<br>Clinics | (0-4) | 1 |
| **Veterinary Medicine and Surgery 526**<br>Obstetrics | (2-0) | 2 |
| **Veterinary Physiology and Pharmacology 529**<br>Pharmacology | (2-3) | 3 |
| **Veterinary Public Health 533**<br>Food Hygiene | (1-2) | 2 |
| | | 20 |

| | | |
|---|---|---|
| **Veterinary Medicine and Surgery 512**<br>Radiology | (2-0) | 2 |
| **Veterinary Medicine and Surgery 514**<br>Infectious Diseases of Small Animals | (2-0) | 2 |
| **Veterinary Medicine and Surgery 516**<br>Operative Surgery of Large Animals | (2-2) | 3 |
| **Veterinary Medicine and Surgery 520**<br>Clinical Seminar | (0-4) | 1 |
| **Veterinary Medicine and Surgery 521**<br>Reproductive Diseases | (2-0) | 2 |
| **Veterinary Medicine and Surgery 524**<br>Operative Surgery of Small Animals | (1-2) | 2 |
| **Veterinary Physiology and Pharmacology 530**<br>Toxicology | (2-2) | 3 |
| **Veterinary Public Health 536**<br>Infectious Diseases of Large Animals | (5-0) | 5 |
| | | 20 |

## FOURTH YEAR

| First Semester | | Credit |
|---|---|---|
| **Veterinary Medicine and Surgery 561**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 563**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 565**<br>Large Animal Clinic | (1-7) | 3 |
| **Veterinary Medicine and Surgery 567**<br>Small Animal Clinic | (1-7) | 3 |
| **Veterinary Microbiology 595**<br>Poultry Diseases | (2-2) | 3 |
| **Veterinary Parasitology 583**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Pathology 577**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 573**<br>Pharmacy | (0-2) | 1 |
| **Veterinary Public Health 591**<br>Food Hygiene | (2-2) | 3 |
| | | 17 |

| Second Semester | | Credit |
|---|---|---|
| **Business Administration 452**<br>Veterinary Jurisprudence | (3-0) | 3 |
| **Veterinary Medicine and Surgery 562**<br>Clinical Laboratory Diagnosis | (0-2) | 1 |
| **Veterinary Medicine and Surgery 564**<br>Ambulatory Clinic | (0-4) | 1 |
| **Veterinary Medicine and Surgery 566**<br>Large Animal Clinic | (0-7) | 2 |
| **Veterinary Medicine and Surgery 568**<br>Small Animal Clinic | (0-7) | 2 |
| **Veterinary Microbiology 596**<br>Poultry Diagnosis | (0-2) | 1 |
| **Veterinary Parasitology 584**<br>Clinical Parasitology | (0-2) | 1 |
| **Veterinary Pathology 578**<br>Applied Pathology | (0-2) | 1 |
| **Veterinary Physiology and Pharmacology 574**<br>Pharmacy | (0-2) | 1 |
| **Veterinary Public Health 592**<br>Public Health | (2-2) | 3 |
| | | 16 |

# THE GRADUATE SCHOOL

The principal objective of the Graduate School is to offer education beyond the Bachelor's level to those men who aspire to become intellectual leaders in various professions and in various fields of teaching and research.

## ADMINISTRATION

The faculty of the Graduate School consists of such members of the teaching staff and of the staffs of the Agricultural Experiment Station, the Texas Engineering Experiment Station, the Texas A. and M. Research Foundation, and the Texas Forest Service as the President may appoint on nomination by the Dean of Graduate Studies. Appointment to the Graduate Faculty is based on recognized scholarly activity, fundamental research, or professional activity.

The Dean of Graduate Studies is the representative of the Graduate Faculty and is responsible for the administration of the academic programs of all graduate students. He administers the policies and regulations set by the Graduate Council and approved by the Academic Council.

The Graduate Council is a standing committee of the Academic Council. It consists of twelve members chosen to give adequate representation to the various parts of the Graduate Faculty. The Graduate Council, acting for the Academic Council, sets the policies and rules by which the graduate programs are administered. Committees on Graduate Instruction are appointed for each of the four degree-granting schools. These committees have general jurisdiction over matters pertaining to graduate work in each of their schools and, through recommendation and representation, participate in the decisions of the Graduate Council.

## ADMISSION

A formal application is required of all persons seeking admission to the Graduate School. The application forms, which are available at the office of the Director of Admissions, should be filed not later than four weeks prior to the opening of the semester. Admission to the Graduate School cannot be granted until all the credentials enumerated in the application form have been filed.

All communications relating to admission should be addressed to the Director of Admissions. Questions on other matters concerned with graduate work should be addressed to the Dean of Graduate Studies or to the appropriate subject matter department.

## GRADUATE DEGREES

Graduate courses of study are offered leading to the degrees of:

Master of Agriculture (M.Agr.)
Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Master of Business Administration (M.B.A.)
Master of Education (M.Ed.)
Master of Engineering (M.Eng.)
Master of Science (M.S.)
Doctor of Education (D.Ed.)
Doctor of Philosophy (Ph.D.)

The Master of Agriculture, Master of Education, and Master of Engineering degrees offer broader training with less technical specialization. Individual research resulting in a thesis is not included. The 36 semester hours of work required includes specified written reports.

The Master of Arts, Master of Science, Master of Business Administration, and Master of Architecture degrees are awarded to students who have received appropriate Bachelor's degrees and have thereafter successfully completed an approved advanced course of study requiring not less than one academic year (32 semester hours) of work.

The degree of Doctor of Philosophy is offered in several fields of basic science with particular emphasis on those fields related to or supporting agriculture and engineering. The Doctor of Education degree is presently offered only in Industrial Education. A student who has received an appropriate Bachelor's degree and has thereafter completed an approved program of advanced study and research may qualify for these degrees.

## PROFESSIONAL DEGREES IN ENGINEERING

The professional degrees in engineering are available to graduates of this college. These degrees are offered on the basis of acceptable professional experience, a thesis or its equivalent, and an examination. Details concerning requirements for this degree may be obtained upon application to the office of the Dean of Graduate Studies.

## RESIDENCE

The Master's degree will be conferred only after a residence at the College of at least one academic year except that this requirement may be satisfied by residence during five summer terms of six weeks each, or an approved equivalent.

The minimum period of time required for the doctoral degree is six semesters of full-time graduate study, or its equivalent, beyond the Bachelor's degree. All of the work, except as noted below, must be done in resident graduate study at some approved educational institution, and at least two of the last four semesters must be spent at the Agricultural and Mechanical College of Texas.

Candidates for the doctoral degree will normally satisfy residence requirements by either (1) two semesters of 12 hours each, or (2) one semester of 12 hours and one summer session of 12 hours.

Full-time staff members engaged in graduate study and registered for less than 12 semester hours will receive proportionate residence credit.

## GRADUATE SCHOOL BULLETIN

There is published annually as a bulletin of the College an announcement of the work of the Graduate School, in which will be found full information concerning conditions of admission and requirements for degrees, including residence, thesis, and examinations. A copy of this bulletin is available upon request at the Office of the Director of Admissions.

# COURSES OF INSTRUCTION BY DEPARTMENTS

All courses offered in the College are described on the following pages and are listed by departments, arranged alphabetically.

The course numbering scheme is as follows:

101 to 199, courses primarily open to freshmen.

201 to 299, courses primarily open to sophomores.

301 to 399, courses primarily open to juniors.

401 to 599, courses primarily open to seniors.

601 to 699, courses primarily open to graduates.

Those undergraduate courses marked at the right by a "†" may be taken for graduate credit.

Figures in parentheses following the number of the courses indicate the clock hours per week devoted to theory and practice respectively. Theory includes recitations and lectures; practice includes work done in the laboratory, shop, drawing room, or field. The unit of credit is the semester hour, which involves one hour of theory, or from two to four hours of practice per week for one semester of eighteen weeks.

Roman numerals to the right of the credit value of each course indicate the semester in which it is regularly offered. The letter "S" denotes summer offerings.

Any course may be withdrawn from the session offerings in case the number of registrations is too small to justify the offering of the course.

## Department of Aeronautical Engineering

Professor A. E. Cronk,
Professors Albert Gail, C. H. Samson, Jr.; Associate Professors
F. C. Hall, C. A. Rodenberger

**201. Elementary Aerodynamics. (3-3). Credit 4. I, S**

Basic aerodynamic phenomena and simplified theory; elementary aircraft performance. Prerequisites: Mathematics 210 or registration therein; Mechanical Engineering 212 or registration therein; Physics 219 or registration therein.

**301. Theoretical Aerodynamics. (3-0). Credit 3. I**

Fluid statics, kinematics, energy, momentum, similarity, viscosity, boundary layer, drag, circulation, lift, potential flow, thin airfoil theory, high lift devices. Prerequisite: Aeronautical Engineering 201.

**302. Experimental Aerodynamics. (1-3). Credit 2. II**

Wind tunnels and testing techniques. Wind tunnel calibration, airfoil pressure distribution, chord loading, airfoil drag by wake survey, boundary layer. Corrections of wind tunnel data for scale and other effects. Prerequisite: Aeronautical Engineering 301.

**303. High Speed Aerodynamics. (3-0). Credit 3. II**

Airfoil section characteristics and critical Mach Number. Span loading, fundamentals of compressible flow, pressure coefficients, critical conditions, aerodynamic heating, shock waves, compressibility effects, sweepback, and high speed data. Prerequisites: Aeronautical Engineering 301, registration in 302.

**304. Elementary Aircraft Structures. (3-0). Credit 3. I**

Airplane load analysis, external and internal loads and reactions for trusses, beams and space frameworks. Prerequisites: Aeronautical Engineering 201; Civil Engineering 305 or registration therein; Mechanical Engineering 212.

**306. Strength of Aircraft Materials. (2-3). Credit 3. II**

Mechanical properties of materials and their use in design of members subject to tension, compression, shear and bending. Combined stresses and margins of safety. Prerequisites: Aeronautical Engineering 304; Civil Engineering 305.

**401. Aircraft Design. (2-6). Credit 4. I**

Aerodynamic design, specification, arrangement, performance analysis, weight and balance, stability. Prerequisite: Aeronautical Engineering 303.

**402. Aircraft Design. (2-6). Credit 4. II**

Structural design of major airframe components, consideration of government airworthiness requirements and customer specifications. Prerequisites: Aeronautical Engineering 401, 405.

**403. Aircraft Materials and Processes. (1-3). Credit 2. I**

Metallography of aluminum alloys, magnesium alloys, steel, nickel alloys, plastics, manufacturing methods, tool design, standards, heat treament, finishes, factory organization. Prerequisite: Aeronautical Engineering 306.

**405. Aircraft Structures. (3-0). Credit 3. I**

Analysis of thin sheet metal structures, including shells, beams, and compression members subjected to critical loads. Prerequisite: Aeronautical Engineering 306.

**406. Aircraft Power Plant Operation. (2-3). Credit 3. II**

The use of modern instruments for testing aircraft engines, analysis of performance, design study, theory of operation. Prerequisite: Mechanical Engineering 410.

**417. Aircraft Propulsion Systems. (3-0). Credit 3. II** †

A study of the development, fundamentals, theories, construction, design, and performance of turbo-jet, ram jet, pulse jet, and rocket power plants for aircraft. Prerequisite: Aeronautical Engineering 401; Mechanical Engineering 410.

**418. Advanced Aerodynamics. (4-0). Credit 4. II** †

Theoretical and experimental aerodynamics for students majoring in aerodynamics. Theory of ideal fluid, viscous effects, compressible flow, and application to design problems. Prerequisites: Must have received at least a grade of B in Aeronautical Engineering 303 and Mathematics 307, or special permission.

**420. Aircraft Vibration and Flutter. (3-0). Credit 3. II**

Analysis of fundamental vibration phenomena with application to aircraft vibration and flutter problem. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**421. Dynamics of Airplanes. (3-0). Credit 3. II** †

Linear theory of vibrations of single and multi-degree of freedom systems; self-excited vibrations. Applications of matrix algebra. Elementary theory of flutter; landing impact, gust response, aero-elastic effects, dynamic stability. Prerequisites: Aeronautical Engineering 401; Mathematics 307 or 308.

**481. Seminar. (1-0). Credit 1. II**

Readings, reports, conferences, and discussion. Prerequisite: Senior classification in aeronautical engineering.

**485. Problems. Credit 1 to 4. I, II, S**

Special problems in aeronautical engineering assigned to individual students or groups. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**601. Principles of Fluid Motion. (4-0). Credit 4. I**

Mathematical methods of analysis are emphasized. Perfect fluid theory development. Treatment of viscosity and boundary layer phenomena. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**603. Aerodynamics of the Airplane. (4-0). Credit 4. II**

Application of vector analysis to two- and three-dimensional airfoil theory. Viscosity and compressibility. Drag of aircraft components. Static and dynamic stability criteria. Prerequisites: Aeronautical Engineering 303; Mathematics 307.

**604. Dynamics of Compressible Fluids. (4-0). Credit 4. I**

Properties of compressible fluids, dynamics of one-dimensional motion, channel flows, shock waves, methods of observation, extension to two- and three-dimensional flow, effects of viscosity. Prerequisites: Aeronautical Engineering 303 and Mathematics 307, or approval of Head of Department.

**605. Aircraft Structural Analysis. (4-0). Credit 4. I**

The classical methods of analysis derived from strain energy and their application to aircraft structural problems. Studies of stresses and strains in aircraft structural arrangements involving thin sheets, sandwich construction, and different materials. Special problems and studies attendant to aircraft column work. Prerequisite: Mathematics 307 or approval of Head of Department.

**606. Aircraft Structural Design. (2-6). Credit 4. II**

Major structural design requirements of high performance aircraft will be studied. New materials and fabrication methods will be considered (magnesium, metalite, material combinations, etc.) Original designs will be undertaken by each student. Prerequisite: Aeronautical Engineering 605.

**607. Aircraft Structural Testing. (1-3). Credit 2. I**

Static and dynamic testing procedures for aircraft structural testing, instruments used, data taking, data analysis, reports. Prerequisites: Aeronautical Engineering 605; Mechanical Engineering 617.

**608. Aircraft Flutter Analysis. (4-0). Credit 4. II**

Theoretical development of the structural and aerodynamic equations for two- and three-dimensional aircraft flutter. Numerical solutions in practical problems to determine flutter velocities. Methods of testing to determine vibration characteristics of aircraft. Prerequisites: Aeronautical Engineering 421 or Mechanical Engineering 459 or 617; Mathematics 307.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in aeronauticaal engineering.

**691. Research. Credit 2 to 6 each semester. I, II, S**

Technical research projects approved by the Head of the Department.

## Department of Agricultural Economics and Sociology

Professor T. R. Timm,
Professors C. A. Bonnen, R. E. Branson, R. L. Hunt, J. G. McNeely, A. C. Magee, B. H. Nelson, Daniel Russell, R. L. Skrabanek; Associate Professors W. G. Adkins, Harley Bebout, D. R. Davis, V. W. Edmondson, J. A. Kincannon, J. E. Miller, C. A. Moore, H. B. Sorensen, J. H. Southern, Randall Stelly, A. B. Wooten; Assistant Professors C. H. Brown, P. E. Hildebrand, D. S. Moore, K. R. Tefertiller, H. S. Whitney

### AGRICULTURAL ECONOMICS

**105. Introduction to Agricultural Economics. (3-0). Credit 3. I, II**

The field of agricultural economics and its relationship to other sciences. The characteristics of our economic system and basic economic concept. Survey of the farm and ranch firm and its organization and management; structure and operation of the marketing system; functional and institutional aspects of agricultural finance; governmental policies and programs related to agriculture.

**314. Marketing Agricultural Products. (3-0). Credit 3. I, II, S**

A general introductory course covering all the operations involved in the movement of agricultural commodities from the farmer to the final consumer; including a detailed study of the essential marketing functions of buying, selling, transportation, storage, financing, standardization, pricing, and risk bearing as they are carried out by the middlemen in our marketing system.

**321. Farm and Ranch Records and Accounts. (2-2). Credit 3. I**

Study of methods and systems of recording and analyzing farm and ranch operational data, and acquirement of skill in summarizing and using records as effective aids in more profitable farming and ranching. Laboratory work devoted to problems in keeping and using the various kinds of records and accounts. Prerequisite: Twelve hours of credit in technical agriculture.

**324. Agricultural Prices. (3-0). Credit 3. I**

An analysis of the factors influencing the level of agricultural commodity prices and related nonagricultural prices; major factors affecting prices of individual farm products, their relative importance and behavior; analysis of price trends and seasonal variation; parity prices; methods of forecasting demand and prices of agricultural products; futures trading versus cash market prices. Prerequisite: Economics 203.

**325. Principles of Farm and Ranch Management. (2-2). Credit 3. I, II**

Application of economic and business principles to the organization and operation of farms and ranches. Special attention to the factors influencing business profits. Laboratory work devoted to development of skills in surveying, analyzing, and reorganization of the farm or ranch for more efficient and profitable operation. Actual data from farms and ranches is used. Prerequisite: Twenty hours of credit in technical agriculture.

**404. Agricultural Marketing. (3-0). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in marketing agricultural products, consisting of some of the more common marketing problems confronting Texas farmers and ranchers, and opportunities for and methods of using marketing principles and practices in educational work with farm people. Examples based on actual marketing problems. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**413. Agricultural Cooperatives. (3-0). Credit 3. I** †

Place of cooperatives in our economic system; historical development and principles of cooperative associations. Steps in organizing an agricultural cooperative; operational aspects of cooperatives including legal considerations, financing, management, and membership relations; future role of cooperatives in American agriculture. Prerequisite: Agricultural Economics 314.

**416. Economics of Livestock Marketing. (2-0). Credit 2. I** †

An economic analysis of the livestock and meat industry; marketing practices of livestock producers; characteristics of major agencies and services; problems associated with the movement of livestock from producer to consumer. Prerequisite: Agricultural Economics 314.

**422. Land Economics. (3-0). Credit 3. I, II**

A study of the economic, institutional, and physical factors involved in the utilization and control of natural resources. Prerequisite: Economics 203.

**429. Agricultural Policy. (3-0). Credit 3. II** †

An analysis of the causes, nature, and effects of government participation in agriculture. Emphasis is upon the interrelationship of American agriculture and the political and economic system, public administration and interest representation. Prerequisite: Economics 203.

**430. Agricultural Finance. (3-0). Credit 3. I, II** †

Analysis of the capital requirements for farming and ranching and how they are obtained; principles involved in the use of each type of credit necessary to sound financial management; the risk, costs, and legal aspects of credit; the security requirements, rates, and terms of the loans available from the private and governmental lending agencies serving agriculture. Prerequisite: Economics 203.

**432. Farm and Ranch Organization and Operation. (2-2). Credit 3. II** †

Detailed problems involved in the organization and management of specific farms and ranches, covering such matters as efficiency analysis, budget preparation, layout, and improvement. Prerequisite: Agricultural Economics 325.

**443. Applied Farm Management. (2-2). Credit 3. S** †

A special three-week summer course for Extension Service personnel and other professional agricultural workers, reviewing basic economic principles used in farm management, the use of these principles in farm business planning, consideration of some of the more common management problems confronting Texas farmers, and opportunities for and methods of using the farm management approach in educational work with farm people. Laboratory work based on actual farms and ranches. Not open for agricultural economics M.S. or Ph.D. majors. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**445. Applied Agricultural Policy. (3-0). Credit 3. S**

A special three-week summer course for Extension Service personnel and other professional agricultural workers, covering government functions in agriculture; goals and values of farm people; nature and significance of political and economic institutions; processes in formation and execution of agricultural policy; case studies in special agricultural policy areas; opportunities for and methods in educational work with farm people in the field of agricultural policy. Prerequisites: Baccalaureate degree; experience in professional agricultural work.

**452. International Trade and Agriculture. (3-0). Credit 3. II** †

World production and demand, present and potential, of agricultural commodities; world trade in farm products with emphasis on causal factors; national and international policies relating to agriculture; status of agricultural resources, technological progress in agriculture, and food requirements in major areas. The course is designed particularly for those interested in foreign agricultural service with governmental agencies or in export-import work with commercial concerns. Prerequisite: Senior classification.

**481. Seminar. (1-0). Credit 1. I**

Role of the social scientist in the agricultural industry; professional opportunities and responsibilities; individual investigations and reports; discussions with prominent leaders in the field. Prerequisite: Senior classification in agricultural economics or approval of the Head of the Department.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisite: Approval of the Head of the Department and the instructor.

## FOR GRADUATES

**601. Farmers Movements. (3-0). Credit 3. II**

History of efforts of farmers to solve their economic problems. Prerequisite: Approval of the Head of the Department.

**602. Agricultural Marketing. (3-0). Credit 3. I, S**

An analysis of the problems involved in the marketing of farm products. Prerequisite: Agricultural Economics 314.

**603. Land Economics. (3-0). Credit 3. II**

A study of selected problems of the allocation and utilization of natural resources with special reference to government organizations, quasi-government bodies, and other interest groups. Prerequisite: Agricultural Economics 422.

**607. Research Methodology. (3-0). Credit 3. I**

A study of the scientific approach, role of theory and assumptions, bias and prejudice, attributes of problems, methods and tools of agricultural economics and sociology research. Each student is asked to critically evaluate research studies and is required to develop his thesis prospectus or its equivalent. Prerequisite: Approval of the Head of the Department.

**611. Production Economics. (3-0). Credit 3. II**

Basic principles upon which problems in agricultural production and resource use can be analyzed. Fundamental principles of production are isolated and these principles applied to agricultural data. Emphasis is placed on the conditions under which efficiency is obtained. The problems of agricultural production and resource use are treated from the standpoint of the technical unit, the firm and society. Prerequisite: Approval of the Head of the Department.

**613. Contemporary Thought in Agricultural Economics. (3-0). Credit 3. I**

A study of contemporary contributions to the thought and analyses of aggregate relationships and problems in the agricultural economy in terms of organizational efficiency and patterns in adjusting to economic development and economic fluctuations. Prerequisite: Approval of the Head of the Department.

**614. Agricultural Policy. (3-0). Credit 3. S**

An analysis of public policies and programs affecting agriculture. Development of policies and programs for agriculture and their bases. Prerequisite: Agricultural Economics 429 or approval of the Head of the Department.

**617. Consumer Economics. (3-0). Credit 3. I**

An analysis of the consumer market for agricultural products; effects of family characteristics, such as size, age, income, and location upon consumer preferences and buying habits; motivations of consumers in buying different products; effectiveness of quality variation, packaging, and displays upon consumer purchases; the place of advertising in market creation; price policies at the retail level; and market research as a guide to marketing policies. Prerequisite: Approval of the Head of the Department.

**619. Farm and Ranch Business. (2-2). Credit 3. I**

An analysis of the interrelationships of factors affecting profits in farming and ranching. Identification of the strong and weak points in the organization and management of actual farm and ranch businesses. Special study and analysis of the management factor affords an opportunity to relate theory and practice in farming and ranching. Prerequisite: Approval of the Head of the Department.

**620. Agricultural Finance. (3-0). Credit 3. S**

Scope of agricultural finance and problems in financing agriculture. Role of credit in agriculture; costs of credit; bases used in extending credit to agricultural producers; payment methods, and legal aspects of agricultural credit. Methods of protecting farm and ranch capital; analysis of agricultural loans; analysis of private and public agricultural credit agencies. Prerequisite: Agricultural Economics 430 or approval of the Head of the Department.

**627. Agricultural Price Analysis. (3-0). Credit 3. S**

Agricultural prices viewed in the light of current economic theory; the application of economic theory to an analysis of agricultural product price determination and price behavior; economic theory as a tool in designing and evaluating governmental price programs for agriculture; consideration of various types of applied economic and statistical research for price analysis and price forecasting. Prerequisites: Agricultural Economics 324; Business Administration 303.

**641. Agricultural Statistics. (2-2). Credit 3. II**

Planning the statistical research project, developing forms, selecting the sample, conducting the study, tabulating, analyses, and interpreting the data. Prerequisites: Business Administration 303 or Genetics 406 or equivalent; 15 hours of social science; approval of the Head of the Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A review of current literature, preparation of papers on selected topics, and discussions with visiting agricultural economists. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of agricultural economics. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the Head of the Department.

## SOCIOLOGY

**205. Principles of Sociology. (3-0). Credit 3. I, II, S**

The basic principles fundamental to an understanding of human relations are analyzed. Students are familiarized with the scope and objectives of sociology. The contributions of biology, geography, group life, and culture and their interrelationships in contributing to the development of personality are reviewed. Attempts are made to instill an appreciation for the complex processes of invention and social evolution which have produced our social systems and culture.

**206. Social Institutions and Processes. (3-0). Credit 3. II**

Sociological concepts and principles that are basic to an understanding of the complexity of modern society. Students, through first hand observation and course materials, are familiarized with social institutions, class structure, and social processes which produce social organization and disorganization. Major social institutions are viewed through the standpoint of social structure and social processes and their future roles in society's operation and influence upon the individual and groups.

**304. Criminology and Juvenile Delinquency. (3-0). Credit 3. I, II, S**

Extent and cost of crime. Causes of crime. Processes of criminal behavior. Ecology of crime. Theories of criminology and penology. The police system. Criminal and juvenile courts, the indeterminate sentence, and pardon. Punishment and treatment of criminals and juvenile delinquents. Prison systems and reformatories. Probation and parole. Recidivism and reformation. Prevention of crime. Prerequisite: Junior classification.

**306. Principles of Social Work. (3-0). Credit 3. II, S** †

The historic development and present organization of private and public welfare agencies and social services. Distinctive techniques of the social work profession in interviewing, group work, case work, and social work organization are emphasized. Students are prepared to assume intelligent leadership on committees and boards of welfare agencies and to explore the possibilities for professional employment in this 20 billion dollar enterprise. Twelve hours of independent field work must be performed if graduate credit is allowed. Prerequisite: Sociology 205 or 6 additional hours of sociology or other social science.

**311. Social Psychology. (3-0). Credit 3. I, II, S** †

An analysis of why people behave the way they do. The effect of social experiences and of the groups people belong to upon the development of personality. How to influence and control the behavior of people. Social adjustment and maladjustment including analysis of causes. Public opinion. Prerequisite: Three hours of sociology or psychology.

**314. Social Problems. (3-0). Credit 3. I**

Significant social problems are explored from the standpoint of the social, economic, political, and physical implications operating to produce the swift impact of social change in a dynamic society. Both academic and practical adjustments or solutions to major problems are considered at the local, state, and national levels so that the student may be better equipped to assume the responsibilities of good citizenship in meeting the problems of today. Prerequisite: Sociology 205 or approval of the Head of the Department.

**315. The Family. (3-0). Credit 3. I, II**

A study of the evolution and growth of the family as the most fundamental social institution. Basic scientific research will be used to throw light on the problems of family formation, courtship, engagement, marriage, etc. Family problems, social and personal adjustment, financing, child rearing are emphasized. Prerequisite: Junior classification.

**320. Social Anthropology. (3-0). Credit 3. I** †

Cultural patterns of the principal cultures are analyzed to reveal social systems, institutions, customs, values, ethos, universal constants, and problems of cultural diffusion. Trainees in technical agriculture, engineering, business, education, public health, and the diplomatic service who anticipate domestic or overseas employment are acquainted with the methods for implementing social, cultural, and technological change. Adjustment of personnel to foreign cultures is emphasized. Prerequisites: Sociology 205 or approval of the Head of the Department.

**404. Rural Community Development. (3-0). Credit 3. I** †

The objective of the course is to help future agricultural workers in doing a better job in their various specialties by recognizing and understanding group processes and organization in carrying on their program. The techniques of rural community development are explored as values to total agricultural and small town development. Community development problems in underdeveloped countries will be surveyed. Prerequisite: Approval of the Head of the Department.

**407. Human Relations in Agriculture. (3-0). Credit 3. I, II, S**

This course is designed chiefly for students in technical agriculture to help them gain broader understanding of the human factors involved in a dynamic agricultural situation. This involves the analysis of interpersonal relationships, group relationships, and institutional relationships in a rapidly changing environment.

**408. Organization for Boy Scout Work. (2-0). Credit 2. II**

History and development of the Boy Scout movement. Understanding the boy and fitting a program to meet his needs. Developing adult leaders in the boy-man institutional relationship. Specialized programs such as cubbing, senior scouting, sea scouting, etc. Fitting scouting to the boy's needs and life pattern.

**412. Population Analysis. (3-0). Credit 3. II** †

Methods of demographic analysis. The influence of population numbers, birth rate, death rate, sex ratio, age composition, nativity, racial composition, and migration on social values and social structure. Theories of population growth and change and their effects on population policies. International aspects of the demographic position of the United States. Prerequisites: Twelve hours of social science; approval of instructor.

**418. Public Opinion and Social Control. (3-0). Credit 3. I** †

Analysis of processes, planned or unplanned, by which individuals are taught, persuaded, or compelled to conform to usages and life values of groups. Nature and use of public opinion and propaganda. Prerequisite: Sociology 205.

**485. Problems. Credit 1 to 3 each semester. I, II, S**

This course will consist of a study of special problems which are not covered by other courses. The content of this course will depend upon the problem studied, the needs and interest of the student, and the number of hours of credit given. Prerequisite: Approval of the Head of the Department and of the instructor.

## FOR GRADUATES

**601. Rural-Urban Relations. (3-0). Credit 3. I, S**

Rural, suburban, and urban trends and socio-economic conditions favoring city growth. Theories of rural and urban ecology; liabilities and assets of rural-urban fringe areas. Social status in town-country relations; rural zoning and the impact of urban culture on rural society. Highway development and rural-urban fusion. Social and economic advantage and disadvantage of metropolitan concentration. The influence of the metropolis on concepts, rules, and institutions related to property. The influence of science and technology on the metropolis. The search for the ideal city. Prerequisites: Sociology 205 or its equivalent or 12 hours of social science*.

**602. Contemporary Theory in Rural Sociology. (3-0). Credit 3. II**

The rise, spread, and development of the field of rural sociology in each of its three central phases—teaching, research, and extension. An objective appraisal of the scientific status of rural sociology and its interrelationships with other sciences. A review of the theories and contributions of past and present-day leading sociologists and other social scientists to the field of rural sociology. Prerequisite: Sociology 205 or its equivalent, or 12 hours of social science*.

**606. Rural Youth Leadership. (4-0). Credit 4. I, S**

To give special insight into the problems of our youth, and training techniques and programs needed to deal with these problems. To acquaint the advanced student with qualities, traits, techniques, attitudes, etc., of successful leaders in various fields. Prerequisite: Twelve hours of social science*.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.

**611. History of Social Thought. (3-0). Credit 3. I, S**

The development of social thought from ancient times to the present. Chief emphasis is placed upon sociological thinkers who have made significant contributions to the field, the theories of these men, and the background from which these theories evolved. Prerequisites: Sociology 205; 12 additional hours of social science*.

**612. The Rural Community. (4-0). Credit 4. II**

The purpose of this course is to acquaint the advanced student with the importance, problems, processes, and techniques of community development. Each student will be given an outside reading and study program to meet his particular interest and needs in his chosen field or specialty. A major purpose is to recognize the community development self-help technique as an effective method of improving rural standards of living in agriculture, health, education, recreation, beautification, etc. Prerequisite: Twelve hours of social science*.

**618. Educational Sociology. (3-0). Credit 3. S**

How our school system can strengthen our democratic way of life. The relationship of education to social organization, social change, and social control. Sociological analysis of the role of education in our society. Prerequisites: Sociology 205 or the equivalent; 9 additional hours of social science or a degree in education.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of sociology. Prerequisite: Six hours of sociology or 12 hours of supporting social science.

**691. Research. Credit 1 or more each semester. I, II, S**

Initiation and completion of a research project of approved scope for an advanced degree. Prerequisite: Approval of the instructor.

## Department of Agricultural Education

Professor E. V. Walton,
Professor Henry Ross**; Associate Professors B. D. Cook, R. N. Craig,
J. D. Gray, J. W. Holcomb, Jr., O. M. Holt, J. R. Jackson

**301. Principles of Agricultural Education. (3-0). Credit 3. I**

An introduction to the study of agricultural education, designed to acquaint the student with the principles of education theory, the aim and meaning of education, leadership training, professional organizations, and literature. Organization and operation of Future Farmer chapters.

**425. Course Building. (2-0). Credit 2. II** †

Preparing units of instruction in vocational agriculture for all-day, part-time, and evening school classes.

**426. Methods in Adult Agricultural Education. (2-0). Credit 2. II** †

Planning educational programs and activities for adult farm people in young farmer and adult classes. Developing skill in the use of the group process in teaching.

**427. Methods of Developing Farming Programs. (1-2). Credit 2. II** †

Planning and supervising farm programs of vocational agriculture students.

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*For this purpose social science is defined to include only courses in agricultural economics, anthropology, economics, political science, psychology, and sociology.
**On leave of absence.

**431. Student-Teaching in Vocational Agriculture. (2-0). Credit 2. I**

Student teaching preparation including orientation in professional ethics and behavior. Selection and use of reference materials and audio-visual aids. Preparation of teaching plans for units of instruction to be taught in selected high school vocational agriculture departments.

**432. Student-Teaching in Vocational Agriculture. (2-6). Credit 4. II**

Planning for and teaching vocational agriculture in selected high school departments in Texas. Six weeks student teaching and observation in local departments of vocational agriculture. Presentation and discussion of problems encountered by practice teachers in the field. A study of current problems in teaching vocational agriculture. Prior planning required. Laboratory hours to include the six weeks student teaching.

**441. Agricultural Extension Organization and Methods. (2-2). Credit 3. I, II, S**

Cooperative agricultural extension service, objectives, organization and administration, operation, results, social and economic significance. Analytical approach to farm and home problems. Principles of extension teaching and measuring results. Methods in selecting, training, and using farm leaders. Principles in dealing with practical problems of planning, developing, and executing county programs. Prerequisite: Senior classification.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of vocational agricultural education or extension education with emphasis on the collection, analysis, and presentation of information. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

(One year of acceptable experience and Agricultural Education 425, 426, 431, 432, or their equivalents are prerequisites to the following courses unless otherwise noted.)

**601. Advanced Methods in Agricultural Education. (3-0). Credit 3. I, II, S**

An advanced course in methods of teaching vocational agriculture.

**605. Supervised Farming. (3-0). Credit 3. I, II, S**

Advanced study of supervised farming in vocational agriculture and methods of supervising students in carrying out supervised farming programs.

**607. Future Farmer and Young Farmer Activities. (3-0). Credit 3. I, II, S**

Methods of conducting Future Farmer and young farmer activities.

**610. Methods in Adult and Young Farmer Education. (3-0). Credit 3. I, II, S**

A study of the methods of determining educational program needs, organizing, conducting and evaluating educational programs in agriculture for adult and young farmer groups. Emphasis on coordinating and utilizing groups and resources in a community in developing agricultural programs. Suitable for teachers of vocational agriculture, county agricultural extension agents, and other professional agriculture workers. Prerequisite: Professional experience or approval of Head of the Department.

**613. Administration and Supervision of Agricultural Education. (3-0). Credit 3. I, II, S**

Problems of organization, administration, financing, and supervision of vocational agriculture, and extension work.

**615. Philosophy of Agricultural Education. (3-0). Credit 3. I, II, S**

A study of the philosophy and evaluation of agricultural education. Emphasis on the development and use of evaluative criteria and tests in the field of vocational education in agriculture.

**616. Program Building in Agricultural Education. (3-0). Credit 3. I, II, S**

Organization of programs in agricultural education on local, state, and national basis. Securing assistance of public school administrators, farmers, and county, state, and national agricultural agencies in program building.

**619. Workshop in Agricultural Education. Credit 1 to 3. I, II, S**

A workshop offered on a one-, two-, or three-week basis to study selected problems in the areas of agricultural or extension education. Committees are set up to utilize consultants in specialized areas of study. Prerequisite: Professional experience or approval of Head of the Department.

**630. Guidance and Counseling for Rural Youth. (3-0). Credit 3. I, II, S**

Analysis of occupational and vocational opportunities for rural youth, techniques of individual group counseling and guidance. Practicum in personality and occupational interest testing. Prerequisite: Approval of the Head of the Department.

**640. Methods of Technical Change. (3-0). Credit 3. I, S**

The dynamics of cultural change as a theoretical framework for the process of planned technical change, the methods of planning and implementing technical change, the effects of technical change and how they can be predicted and planned, programs of planned technical change in the United States and abroad. The land grant college as an institutional vehicle for planned technical change. Especially adapted for foreign students and American educators and technicians preparing for duty abroad. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Studies related to classroom, laboratory, supervised farming, and adult education activities. For Master of Education programs only.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis for Master of Science programs only.

## Department of Agricultural Engineering

Professor Price Hobgood,
Professors W. E. McCune, J. W. Sorenson; Associate Professors O. R. Kunze,
E. T. Smerdon, L. H. Wilkes; Assistant Professors W. H. Aldred,
C. M. Hohn, B. R. Stewart; Instructor D. R. Stipe

**201. Farm Power and Machinery. (2-2). Credit 3. I, II**

Construction, operation, adjustment, and servicing of farm engines and tractors. Adaptability, selection, economic utilization, construction, operation, and adjustment of the principal tillage, planting, cultivating, harvesting, and feed processing machines.

**205. Materials in Light Structures. (2-3). Credit 3. I**

Selection and utilization of materials for light structures. Specifications and cost estimation. Prerequisite: Engineering Graphics 105.

**208. Farm Machinery. (2-3). Credit 3. II**

Mechanics, design, and materials of farm machinery construction. Rotary power transmission, hydraulic controls, method of construction, functional requirement, principles of operation, safety, performance characteristics, capacity, economic utilization. Analysis of tillage, planting, harvesting and handling mechanisms. Prerequisite: Physics 218.

**213. Food Plant Engineering. (2-3). Credit 3. II**

Elementary mechanics, power transmission, steam and steam boilers, pipes and pipe fitting, refrigeration and insulation, temperature measurement and control, electric motors, disposal of waste products, and mechanical problems as applied to foods and food processing.

**221. Farm Shop. (1-3). Credit 2. I**

A course for students in agricultural education and general agriculture involving carpentry and woodwork, tool sharpening, preparation of simple drawings and bills of materials, blueprint reading, and rafter cutting.

**222. Farm Shop. (1-3). Credit 2. I, II**

A course for students in agricultural education and general agriculture involving electric and gas welding, cold metal work, forging, soldering, pipe fitting, and the preparation and use of concrete.

**301. Agricultural Structures Design. (2-3). Credit 3. I**

This course includes a study of the basic requirements of livestock buildings and storage structures including the consideration of sanitation control, environmental control, economy, convenience, and materials application. It also treats the basic requirements of the farm home. Prerequisites: Engineering Graphics 105, 106.

**324. Agricultural Engine and Tractor Design. (2-3). Credit 3. II**

Principles of farm tractor chassis design, traction devices, stability, hitches, power transmission, construction, operation and design of internal combustion engines. Engineering principles of carburetion, ignition, cooling, lubrication, hydraulic systems, and operator's comfort, convenience, and safety. Methods of testing and rating tractors and power units. Prerequisites: Mathematics 307; Mechanical Engineering 212, 313, or registration therein.

**325. Farm Electricity. (2-2). Credit 3. I, II**

A course for students in agricultural education and general agriculture which covers elements of electric current generation and transmission, applications of electric heating, lighting and power, wiring motors, power rates, meter reading, safety rules and regulations.

**335. Water Control and Utilization. (2-3). Credit 3. I, II**

Elementary surveying, including chaining, leveling, and mapping as applied to farm needs. Water control and utilization emphasizing irrigation principles and practices, associated problems of drainage, and fundamentals of terracing and farm pond design.

**410. Irrigation and Drainage Engineering. (2-3). Credit 3. II** †

Engineering principles of irrigation. Water sources; measurement and distribution of water; irrigation pumps; design of surface and sprinkler irrigation systems; salinity control. Drainage engineering. Design of surface and subsurface drainage systems; drainage districts and laws. Prerequisites: Agronomy 445 or registration therein; Civil Engineering 201, 311.

**413. Agricultural Structures Design. (2-3). Credit 3. II** †

Engineering principles of farm structures design; loads, reactions, and force systems; analysis and design of wood and steel beams, light frames and connections. Fundamentals of design of concrete beams, slabs, and columns as applied to agricultural buildings. Prerequisites: Agricultural Engineering 301; Civil Engineering 305.

**418. Agricultural Process Engineering. (2-3). Credit 3. I** †

Engineering principles in agricultural processing. Psychrometrics and thermodynamics of air, water, water vapors and pressures, vapor transmission, drying humidification, heating, refrigeration, heat transfer, conditioning of air, fluid flow, ventilation, fan laws and air conveying. Prerequisite: Mechanical Engineering 323.

**428. Soil and Water Conservation Engineering. (2-3). Credit 3. I** †

Engineering principles of soil and water conservation. Rainfall and runoff; soil erosion by water and wind; terrace and terrace outlet design; design of agricultural reservoirs and related structures. Prerequisites: Civil Engineering 201, 311, or registration therein.

**430. Farm Electrification Engineering. (2-3). Credit 3. II** †

Principles of electricity in farm electrification. Fundamentals of alternating currents and circuits with emphasis on power, energy, resistance, inductance, capacitance and power factor. Includes the theory of magnetism and principles of transformers, generators and motors. Prerequisite: Electrical Engineering 305.

**440. Farm Electrification. (3-0). Credit 3. S** †

This course includes the fundamentals of farm wiring, lighting and the design, construction, and operation of electric water systems, refrigeration equipment, brooders, milking machines, feed processing and handling equipment, hay and grain driers, and other electric equipment used in farm production. This is a special course for teachers and prospective teachers in vocational agriculture to be offered for a three-week period during the summer.

**481. Seminar. (1-0). Credit 1. I** †

A review of current literature dealing with agricultural engineering problems presented by staff members and students. Prerequisite: Senior classification.

**482. Seminar. (1-0). Credit 1. II** †

Presentation of papers dealing with new developments and results of investigations of problems related to agricultural engineering. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Instrumentation and Research Methods. (3-0). Credit 3. I, II**

Analysis of research techniques, study of the theory and use of instruments in research including instrumentation for research in irrigation and drainage and other phases of agricultural engineering. Also the design and use of research models and analogies, and an introduction to available research facilities. Prerequisite: Admission to Graduate School.

**602. Irrigation and Drainage. (3-0). Credit 3. I, II**

Theory and practice in irrigation and drainage including soil moisture and moisture movement, soil moisture measurements, erosion and sedimentation of irrigation and drainage structures, and characteristics of pumps. Also includes effect of low quality irrigation water, salinity and alkali problems and their control, efficiency of irrigation water usage, drainage methods, and legal aspects of irrigation and drainage. Prerequisite: Agricultural Engineering 410.

**603. Agricultural Machinery. (3-3). Credit 4. I, II**

The theory and practice of functional farm machinery design. Encompasses an analysis of the problem need, the functional requirements, the common materials used, the design, testing, and production of efficient operational units.

**605. Agricultural Structures. (3-0). Credit 3. I, II**

A study of the structural, environmental, and economic problems encountered in agricultural buildings with special emphasis on design considerations for structural materials. Also research methods and procedures as they apply to agricultural structures. Prerequisites: Agricultural Engineering 205, 413, 418.

**606. Agricultural Process Engineering. (3-0). Credit 3. I, II**

Basic engineering principles involved in mechanical handling, cleaning and sorting, size reduction, conditioning, and storage of agricultural products. Includes the use of refrigeration, electric energy, and radiation. Prerequisites: Agricultural Engineering 418, 430; Mechanical Engineering 323.

**609. Farm Power. (3-3). Credit 4. I, II**

A study of the basic theory and principles of operation as applied to internal combustion engines used for agriculture. Emphasis is given to the application and functional design requirements and testing procedures. Prerequisites: Agricultural Engineering 324; Mechanical Engineering 323.

**613. Soil and Water Conservation Engineering. (2-3). Credit 3. I, II**

A study of soil and water conservation, with emphasis on the hydrology of agricultural watersheds, soil erosion theory, functional design of soil and water conservation structures, methods of reducing water losses, and experimental techniques. Prerequisites: Agricultural Engineering 428; Civil Engineering 463.

**685. Problems. Credit 1 to 4 each semester. I, II**

Advanced laboratory or field problems not related to student's thesis. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Research for the thesis or dissertation.

## Department of Agronomy

Professor W. O. Trogdon,
Professors M. E. Bloodworth, M. S. Brown, L. C. Coffey, J. F. Fudge, H. E. Hampton, E. C. Holt, G. W. Kunze, T. E. McAfee, R. C. Potts; Associate Professors A. G. Caldwell, F. L. Fisher, C. L. Godfrey, R. D. Staten, E. L. Whiteley; Assistant Professors J. E. Endrizzi, J. F. Mills; Instructors J. R. Justin, J. A. Long, R. B. Metzer

**105. Fundamentals of Crop Production. (2-2). Credit 3. I, II**

Classification and distribution of farm crops; importance of good varieties and good seed; crop improvement; preparation of the seed bed; commercial fertilizers; manures and lime; seeding practices; crop tillage; harvesting; meadow and pasture management; weeds; crop rotation; diseases and insect enemies.

**301. Soil Science. (3-2). Credit 4. I, II, S**

A basic course in soil science which deals with the principles of soil chemistry, physics, microbiology, fertility, and pedology. Prerequisite: Chemistry 102.

**305. Seed Technology and Commercial Grading. (2-3). Credit 3. II**

A study of the important crop seeds with emphasis on harvesting, cleaning, and storage as they influence quality of planting seed. The grading of grain, cotton and hay according to Federal standards. Prerequisites: Agronomy 105; Biology 101.

**306. Grain and Fiber Crops. (3-2). Credit 4. I**

A study of the geographical distribution, classification, physiology, principles of production, and use of the grain and fiber crops. Prerequisites: Agronomy 105, 301; Biology 101.

**308. Forage Crops. (2-2). Credit 3. I, II**

The production, utilization, and identification of the major forage crop plants with emphasis on adapted species and varieties for the Southwest. Prerequisites: Agronomy 105, 301; Biology 101.

**310. Soil Morphology. (1-3). Credit 2. II**

Field study of the morphological features of the soil profile in relation to soil utilization and management. Soil development, classification, and mapping are also covered. Prerequisite: Agronomy 301.

**318. Soil Conservation. (3-3). Credit 4. I, II, S**

A course dealing with the importance of soil conservation from the standpoint of different soil types in the agricultural regions of Texas and the United States. Conservation methods are presented according to climatic regions, cropping systems, topographic locations, and other influencing factors. Field practice in the making of a map of a farm, its soil, and a plan of reorganization for soil conservation. Prerequisite: Agronomy 301.

**413. Soil and Crop Management. (3-0). Credit 3. II** †

A study of the special problems in the utilization and management of soils and crops under varying soil and climatic conditions. Independent work in solving current agronomic problems in different parts of the Southwest required. Prerequisites: Agronomy 301; senior classification.

**417. Pasture Management. (2-2). Credit 3. I, II** †

Adaptation and management of native and introduced pasture plants; their establishment, production, utilization, and maintenance in permanent and temporary pastures. Field trips are required. Prerequisites: Agronomy 301, and either Agronomy 308 or Range and Forestry 303.

**422. Soil Fertility. (3-4). Credit 4. I, S** †

An advanced course dealing with the more technical consideration of the physical, chemical, and biological factors influencing the crop producing power of the soil. Prerequisites: Agronomy 301; Chemistry 223, 231; Plant Physiology and Pathology 313.

**426. Fertilizer Technology. (2-0). Credit 2. II**

A study of the problems of the manufacture, storage, and application of commercial fertilizers, including a limited number of required field trips to various types of fertilizer plants. Prerequisites: Agronomy 301; 14 hours of chemistry and/or physics.

**428. Turf Management. (2-2). Credit 3. II**

A study of the fundamental and special problems in the establishment, utilization, and management of turf grasses under varying use conditions. Field trips are required. Prerequisites: Agronomy 301; Plant Physiology and Pathology 301, 313.

**445. Soil Physics. (2-3). Credit 3. I** †

A study of the fundamentals of soil physics and their application to the solution of problems in crop production, irrigation, and engineering. Prerequisites: Nine hours of soils and physics, with a minimum of three hours of each (may include soil mechanics).

**481. Agronomy Seminar. (1-0). Credit 1. I, II**

The preparation and presentation by the students of papers on pertinent agronomic topics. Required of all agronomy majors in their last semester. Prerequisite: Senior classification in agronomy.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit field or laboratory investigations or the study of subject matter not included in established courses. Prerequisites: Ten hours of junior and senior agronomy.

## FOR GRADUATES

**601. Grain and Cereal Crops. (3-0). Credit 3. II**

An advanced study of grain and cereal ecology, utilization, physiology and morphology, including a critical review of world literature reporting recent investigations in this field.

**602. Forage Crops. (3-0). Credit 3. I**

An advanced study of forage production, utilization, ecology, physiology, and morphology. Factors affecting initiation of regrowth and seed and forage quality. It includes a critical review of world literature reporting recent investigations in this field.

**605. Pedology. (3-0). Credit 3. I**

An advanced study of the development, morphology, constitution, and classification of soils.

**617. Advanced Soil Physics. (3-3). Credit 4. II**

The physical constitution and properties of soil, including consistence and structure, aeration, soil water, and thermal relationships. Prerequisites: Agronomy 445 or the equivalent and a two-semester course in physics. (Offered in 1960-61 and in alternate years thereafter.)

**618. Advanced Soil Analysis. (2-3). Credit 3. II**

A course designed to familiarize the student with the more difficult problems of soil analysis and the interpretation of the data. Prerequisite: Agronomy 422. (Offered in 1961-62 and in alternate years thereafter.)

**624. Physical Chemistry of Soils. (3-3). Credit 4. I**

The physical chemistry of clay minerals and the inorganic and organic soil colloids. Prerequisites: Agronomy 617, 618; Chemistry 323, 324. (Offered in 1960-61 and in alternate years thereafter.)

**626. Soil Mineralogy. (3-3). Credit 4. I**

A study of the crystal structures and properties of the more important agricultural and industrial clays combined with identification techniques involving X-rays, differential thermal analysis, and electron microscopy. (Offered in 1961-62 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A seminar for graduate students and staff members in soils and crops. Presentation and discussion of special topics and research data in the field of agronomy. Participation is required of all graduate students in agronomy.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced problems in some phase of agronomy not directly related to the thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the thesis or dissertation.

## Department of Air Science

C. E. Gregory, Colonel, USAF
Professor of Air Science

### UNITED STATES AIR FORCE

Associate Professors: Lieutenant Colonel K. W. Gruber; Majors: R. W. Garrison, B. F. Smith, C. B. Wells, Jr., K. Wolf; Assistant Professors: Captains D. E. Allen, W. F. Atwater, J. M. Bennett, Jr., B. T. Duncan, S. D. Goode, E. H. Higgins, J. B. Killebrew, P. D. Weihs, H. F. Weitzel

### BASIC COURSE OF AIR SCIENCE

**141. Foundations of Air Power. (0-3). Credit 1. I**

First semester Basic Air Science. An introduction to the elements and potentials of air power to include: fundamentals of air power; military air power of nations; air research and development; the aircraft industry, airlines and airways; air vehicles and principles of flight.

Leadership Laboratory: Introduction to the methods of Air Force organization and the requirement of "followership" at element and flight level. Opportunities are provided for the cadet to subject himself to personal and group discipline, to identify himself with a group, and to acquire the training, poise, and self-confidence needed to conduct himself in a military manner.

**142. Foundations of Air Power. (0-3). Credit 1. II**

Second semester Basic Air Science. Continuation of the study of principles of flight to include areodynamics, control, navigation and guidance, propulsion systems, and space vehicles. A study of the military instrument of national security and professional opportunities in the USAF.

Leadership Laboratory: Continuation of Air Science 141 laboratory.

**241. Foundations of Air Power. (0-3). Credit 1. I**

Third semester Basic Air Science. A more advanced consideration of air power and the development of aerial warfare to include the principles of warfare, the evolution of aerial warfare, and weapons systems development.

Leadership Laboratory: Practice in elementary leadership activities involving small groups and an introduction to leadership methods and cadet corps organization at the group and wing level. The cadet is provided with opportunities to test his leadership skill in situations dealing with small groups and to recognize and accept personal responsibility.

**242. Foundations of Air Power. (0-3). Credit 1. II**

Fourth semester Basic Air Science. Continuation of Air Science 241 to include USAF operations in peacetime and wartime and the future of air power.

Leadership Laboratory: Continuation of Air Science 241 laboratory.

## ADVANCED COURSE OF AIR SCIENCE

**301. Officer Development. (0-2). Credit 1. I**

First semester Advanced Air Science. A study of the functions of the commander and his staff, including Air Force conferences, staff meetings, and correspondence. Concurrent enrollment in English 210 and English 401 (or 403) is a requirement for this course.

Leadership Laboratory: Development of leadership skills dealing with larger and more complex groups (i.e., groups and wings) and an introduction to command and staff principles and methods at all levels. The cadet is provided with an opportunity to assume full responsibility for significant parts of the cadet corps program.

**342. Officer Development. (2-3). Credit 3. II**

Second semester Advanced Air Science. Leadership seminar: A study of the principles and practices of leadership to include basic psychology of leadership and application of problem solving techniques and leadership theory to simulated and real Air Force problems. Military justice system: A study of the system by which military justice is administered.

Leadership Laboratory: Continuation of Air Science 301 laboratory.

**401. Officer Development. (0-2). Credit 1. I**

Third semester Advanced Air Science. An introduction to weather and air navigation for the Air Force officer. Concurrent enrollment in History 318 or Geography 401 is a requirement for this course. (If History 318 is taken during the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Development of leadership and management understandings and skills at the command level. The cadet is given an opportunity to plan for the achievement of group objectives and supervise the implementation of cadet planning by coordination and control through cadet corps command and staff channels.

**402. Officer Development. (0-2). Credit 1. II**

Fourth semester Advanced Air Science. Presentation of material to help the cadet make a rapid, effective adjustment to active duty as an officer of the United States Air Force. Concurrent enrollment in History 318 or Geography 401 is a requirement for the course. (If History 318 is taken the first semester, Geography 401 must be taken during the second semester and vice versa.)

Leadership Laboratory: Continuation of Air Science 401 laboratory.

## Department of Animal Husbandry

Professor O. D. Butler, Jr.,
Professors T. C. Cartwright, F. I. Dahlberg, Fred Hale, H. O. Kunkel, J. K. Riggs; Associate Professors G. T. King, A. M. Sorensen, Jr.; Assistant Professors W. T. Berry, Jr., L. D. Wythe, Jr.; Instructors D. C. Kraemer, F. A. Orts, C. F. Parker

**107. General Animal Husbandry. (2-3). Credit 3. I, II**

This course is a study of the selection, breeding, feeding, management, and marketing of beef cattle, sheep, Angora goats, swine, horses, and meat evaluation. An introduction to the broad field of animal husbandry; an appreciation of the importance of the livestock and meats industry in American agriculture and the American economy; basic fundamental principles of animal husbandry to create a desire to learn and study more about the field.

**302. Trends in Livestock Selection. (2-2). Credit 3. II**

The natural selection of livestock in the wild state. Domestication and adaptation to different environments. The breed concept. Balancing visual selection, pedigree, and records of performance. Prerequisite: Animal Husbandry 107.

**303. Animal Nutrition. (3-0). Credit 3. I, II**

Chemical composition of feeding stuffs; composition of farm animals; digestion; metabolism and the function of nutrients; minerals; vitamins; antibiotics, hormones, and other regulators in feeds. Prerequisite: Chemistry 231 or 227.

**307. Meats. (2-3). Credit 3. I, II**

Study and practice of slaughtering and cutting carcasses of cattle, sheep, and hogs. Meat will be cured and meat products prepared. Uses of by-products will be considered. Factors affecting quality, palatability, and economy in selection of meats will be included. The location, structure, and functions of the endocrine glands, digestive organs, and reproductive organs will be discussed in the laboratory in connection with slaughtering. Prerequisite: Animal Husbandry 107 or approval of the Head of the Department.

**309. Feeds and Feeding. (2-2). Credit 3. I, II**

A course designed to study the principal feeds and feedstuffs used in the feeding of all classes of livestock from a practical point of view; to develop in the student an understanding of the significance of the basic feed nutrients and the application of basic principles of nutrition to formulating rations for livestock production; utliization of by-product feeds; methods of feeding; feed processing; flexible feeding programs; feed control laws; feeding investigations. Prerequisite: Animal Husbandry 303.

**313. Horse Management and Training. (1-2). Credit 2. I**

Breeding, feeding, management, and training of quarter and pleasure horses; growing and developing foals; anatomy; unsoundness; parasites and diseases; stables and equipment; shoeing; fitting for show and sale. Prerequisite: Animal Husbandry 303; Genetics 301; or approval of Head of Department.

**315. Livestock Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of livestock for both breeding and slaughter purposes.

**317. Meats Judging. (1-3). Credit 2. I**

A detailed consideration of the factors involved in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb.

**320. Animal Nutrition and Feeding. (3-0). Credit 3. II**

A review of the chemical aspects of animal nutrition. The role of carbohydrates, fats, proteins, vitamins, and minerals in animal nutrition. Nutritional requirements of farm animals. Formulation of rations. A study of feeds and feedstuffs which supply the nutritional requirements. For students of veterinary medicine. Prerequisite: Biochemistry and Nutrition 312.

**406. Beef Cattle Production. (2-2). Credit 3. I, II** †

Systems of production; establishing a breeding herd; mating and reproduction; performance and progeny records for selecting breeding stock; feeding and managing the breeding herd; systems of managing stockers and feeders; fattening cattle for market; farm steer beef production and commercial feedlot finishing; planning commercial and purebred cattle enterprises; fitting and showing; animal health; marketing. Prerequisite: Animal Husbandry 303.

**412. Swine Production. (2-2). Credit 3. I** †

Historical; feeding and handling the breeding herd during various seasons; culling; meat type hog selection records; the sow and the litter; grow-and fattening pigs; forage crops; feeding on forage; dry lot feeding; choice and value of feeds; garbage feeding; prevention of disease; the purebred herd; fitting and showing. Prerequisite: Animal Husbandry 303.

**414. Sheep, Goats, and Fiber Technology. (3-2). Credit 4. II**

Methods of management; selection and culling; environmental factors affecting kid and lamb production; care and feeding of lambs, kids and breeding stock; marketing of sheep and goat products. Wool and mohair; grades and lengths; physical and chemical properties; processing; judging and appraisal. Prerequisite: Animal Husbandry 303 or approval of Head of Department.

**416. Livestock Management. (1-2). Credit 2. II**

A course in the feeding and management of beef cattle, sheep, swine, and horses. Especially designed for agricultural education majors. Prerequisite: Animal Husbandry 303.

**433. Reproduction in Farm Animals. (2-2). Credit 3. I, II** †

The course is designed to acquaint the students with the reproductive processes as they are exemplified mainly in cattle, sheep, swine and horses. The material presented deals with the anatomy and physiology of the male and female reproductive tracts; hormones directly controlling reproduction, estrus and estrous cycles; ovulation; mating; gestation; pregnancy tests; parturition; sperm physiology; semen evaluation; collection and storage of semen; factors affecting fertility rates and the primary causes of sterility in females and males. Prerequisite: Veterinary Anatomy 202 or approval of Head of Department.

**437. Marketing and Grading of Livestock and Meats. (2-2). Credit 3. I, II**

Factors determining market classes and grades of feeder, stocker, and slaughter animals; grading feeder, stocker, and slaughter animals; marketing machinery and handling market livestock; purebred sales; shipping losses; shrinkage; fills. Prerequisite: Senior classification.

**440. Sheep and Wool Production Problems. (2-3). Credit 3. S**

Latest developments in the feeding, breeding, and management of the sheep flock including the production, harvesting, preparation for market, and marketing of the wool clip. Special summer course for agricultural agents.

**442. Advanced Livestock Judging. (0-3). Credit 1. II**

An advanced course in the selection and grading of livestock. Prerequisite: Animal Husbandry 315 or approval of Head of Department.

**444. Large Animal Nutrition. (3-0). Credit 3. II** †

A consideration of feed energy and its utilization. A study of the metabolic and physiological bases for quantitative requirements of large animals for nutrients. Comparison of the nutrition of ruminants and monogastric animals. Prerequisites: Animal Husbandry 303; Poultry Science 411 or approval of Head of Department.

**447. Advanced Meat Selection. (0-3). Credit 1. II**

An advanced course in the selection and grading of carcasses and wholesale cuts of beef, pork, and lamb as they are correlated with live animal evaluation. Prerequisite: Animal Husbandry 317 or approval of the Head of the Department.

**481. Seminar. (1-0). Credit 1. I, II**

A review of current literature and research problems related to the livestock industry. Prominent men in the field of animal husbandry may be invited to conduct the seminar. For senior students in animal husbandry.

**485. Problems. Credit 1 to 4. I, II, S**

A directed individual study of a selected problem in the field of animal husbandry. Prerequisites: Senior classification; approval of the Head of the Department.

## FOR GRADUATES

**600. Advanced Livestock Management. Credit 3. S**

A special three-week workshop course for teachers of vocational agriculture to be offered during the summer. This course includes problems in all phases of animal production selected by the group under the supervision of the instructor.

**605, 606. Advancements in Beef Cattle Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of beef cattle production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of beef cattle. Prerequisites: Animal Husbandry 406; Genetics 306; or approval of Head of Department.

**619, 620. Advancements in Sheep and Angora Goat Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relative to the various phases of sheep and angora goat production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of sheep and angora goats. Prerequisites: Animal Husbandry 414; Genetics 306; or approval of Head of Department.

**621, 622. Advancements in Swine Production. (3-0). Credit 3 each semester. I, II**

A comprehensive review of recent advances in research relating to the various phases of swine production; the application of the basic principles of nutrition, animal breeding, and disease control to the feeding, breeding, and management of hogs; fitting swine production to the whole farm enterprise; special problems relating to the planning and operation of swine production units. Prerequisites: Animal Husbandry 412; Genetics 306; or approval of Head of Department.

**631. Physiology of Reproduction. (2-0). Credit 2. II**

A critique of scientific literature concerning the processes of reproduction in farm mammals. Students will compile, evaluate, and summarize the literature on various phases of this subject. Consideration will be given to special problems on which further investigations are desirable and methods of outlining research projects for them. Prerequisite: Animal Husbandry 433.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the field of animal husbandry. Review of current literature and presentation of papers on selected animal husbandry topics. Prerequisites: Graduate classification; major in animal husbandry or genetics.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Advanced studies in animal husbandry problems and procedures. Problems assigned according to the experience, interest, and needs of the individual student. Registration by approval of Head of Department. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Investigations leading to the student's thesis or dissertation in the fields of animal production, meats, wool and mohair, nutrition, inheritance of farm animals, and physiology of reproduction. Prerequisite: Graduate classifcation.

## Division of Architecture

Professor T. R. Holleman,
Professors J. G. McGuire, M. M. Rotsch, Richard Vrooman; Assistant Professors B. H. Evans, C. J. Godwin, Fred Klatt, Jr., J. H. Marsh, III, W. G. Wagner, J. C. Walden, F. E. Whitson; Instructors J. H. Hinojosa, W. G. Horsley, A. L. Stacell; Lecturers Joseph Donaldson, Jr., J. W. Hall

### ARCHITECTURE

**101. Design I. (0-6). Credit 2. I, S**

Analysis and application of the principles of design, with emphasis on the visual elements and the basic concept of their organization.

**102. Design I. (0-6). Credit 2. II, S**

Extension of Architecture 101. Further study and application of the principles of design, with emphasis on the proper use of materials in the basic order of space. Prerequisite: Architecture 101.

**115. Architectural Graphics. (1-3). Credit 2. I, S**

Drafting techniques; the principles of shades and shadows; perspective drawing.

**116. Architectural Graphics. (1-3). Credit 2. II, S**

Continuation of Architecture 115; perspective drawing; techniques of architectural delineation and graphic design. Prerequisite: Architecture 115.

**201. Design II. (0-12). Credit 4. I**

Extension of first-year design principles and graphics. Studies of structures and structural materials. Site and building relationships. Design of simple buildings. Color selection. Prerequisites: Architecture 102, 116.

**202. Design II. (0-12). Credit 4. II**

Continuation of Architecture 201. More thorough detailing of design solutions, especially in small buildings. Prerequisites: Architecture 201, 205.

**205. Graphic Art. (0-6). Credit 2. I, S**

Application of principles of design to graphic art concepts, media and techniques. Prerequisites: Architecture 102 for architectural students; equivalent experience preferred for others.

**206. Graphic Art. (0-6). Credit 2. II, S**

Continuation of Architecture 205. Further application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 205 or equivalent.

**227. Structural Principles. (3-0). Credit 3. I**

(For Option I Design students) Examination of structural systems and their structural, economic, and esthetic suitability as applied to architectural problems. Review of first year mathematics and an introduction to calculus as applied to structural design. Prerequisites: Mathematics 102, 116.

**228. Elements of Mechanics. (3-0). Credit 3. II, S**

Analysis of the external effects of a force system acting on a body at rest. Determination of section properties with emphasis leading to architectural structures. Perequisite: Architecture 227 or Mathematics 223.

**253. Technology of Materials. (2-0). Credit 2. I**

A study of materials of construction, their properties, manufacture, characteristics, and uses. Prerequisite: Sophomore classification.

**254. Technology of Materials. (2-0). Credit 2. II**

Selection of materials, methods of construction. Prerequisite: Architecture 253.

**301. Design III. (0-15). Credit 5. I**

Intermediate design stressing complete solutions to individual problems. Emphasis on concept, methods, and materials of construction. Seminars dealing with architectural and related design fields. Prerequisite: Architecture 202.

**302. Design III. (0-15). Credit 5. II**

Further studies in intermediate design enlarging upon Architecture 301. Prerequisite: Architecture 301.

**305. Graphic Art. (0-6). Credit 2. I**

Continuation of Architecture 206. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 206 or equivalent.

**306. Graphic Art. (0-6). Credit 2. II**

Continuation of Architecture 305. Advanced application of principles of design to graphic art concepts, media and techniques. Prerequisite: Architecture 305 or equivalent.

**325. Survey of Contemporary Art. (1-0). Credit 1. I**

A survey of the background and development of contemporary art, including the objectives, terminology, idioms, techniques and media of painting, sculpture and the graphic arts, with particular emphasis on their relation to architecture and the allied arts. Prerequisites: Junior classification for architecture students; sophomore classification for others.

**326. Survey of Contemporary Art. (1-0). Credit 1. II**

Extension of Architecture 325, with emphasis on relating contemporary art trends to cultural and technological developments. Prerequisite: Architecture 325 or equivalent.

**327. Basic Structures. (3-0). Credit 3. I**

Fundamentals of strength of materials, with emphasis on their application to architectural structures. Prerequisite: Architecture 228.

**328. Steel Structures. (2-2). Credit 3. II**

Application of the principles of statics and strength of materials to the design of architectural steel structures. Prerequisite: Architecture 327.

**331. Mechanics and Materials. (2-3). Credit 3. I, II**

A terminal course designed to acquaint the student with the general principles of mechanics and strength of materials and to give him some facility in their application to simple framing systems. (For students in Industrial Education.) Prerequisites: Mechanical Engineering 101; Physics 201.

**335. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. I**

To acquaint and familiarize students with types, classes, functions, and limitations of mechanical and electrical equipment and their components. Various systems of plumbing, piping, heating, cooling, electrical distribution and wiring systems are studied in their relation to building construction. Prerequisites: Physics 202; junior classification.

**336. Mechanical and Electrical Equipment for Buildings. (3-0). Credit 3. II**

A continuation of Architecture 335. Further study is made of the components of mechanical and electrical equipment as to their logical applications in completed systems of plumbing, space conditioning, and electrical wiring. Prerequisite: Architecture 335.

**339. Art and Civilization. (3-0). Credit 3. I, S**

Historical survey of the cultures of man with respect to art and architecture. Prerequisite: Junior classification.

**340. History of Architecture. (3-0). Credit 3. II**

Historical study of the development of architecture from the Pre-Classic through the Greek and Roman Classic, the Early Christian, Byzantine, Saracenic, and Romanesque periods. Prerequisites: Architecture 339 for students in architecture; junior classification for others.

**401. Design IV. (0-15). Credit 5. I**

Architectural and planning problems, with emphasis on analysis, research and design. Study of relationship of architecture, landscape architecture, city and regional planning, and other related design fields. Prerequisite: Architecture 302.

**402. Design IV. (0-15). Credit 5. II**

Continuation of Architecture 401, with architectural and planning problems of a more complex nature. Prerequisite: Architecture 401.

**427. Concrete Structures. (2-3). Credit 3. I, S**

Study of reinforced concrete for architectural structures; analysis and design; systems of forming. Prerequisite: Architecture 328.

**428. Roof Structures. (2-3). Credit 3. II, S**

The analysis and design of conventional roof system; roof trusses, beams and columns, and current roof deck systems. Prerequisite: Architecture 328.

**433. Architectural Environment. (3-0). Credit 3. I**

Study of environmental factors related to architectural design in terms of natural lighting, natural ventilation and sound. Prerequisites: Physics 202; junior classification.

**439. History of Architecture. (3-0). Credit 3. I**

Historical study of the development of architecture from the Gothic through the Renaissance and Post-Renaissance periods of Europe. Prerequisite: Architecture 340.

**440. History of Architecture. (3-0). Credit 3. II**

Historical study of American Period architecture, and the background, principles, philosophies, and significant figures of the Contemporary Movement in America and Europe. Prerequisite: Architecture 439.

**454. Specifications and Working Drawings. (1-6). Credit 3. I, II**

Detailed specifications; supervision and superintendence; building laws and codes; working drawings. Prerequisites: Architecture 202, 254.

**500. Summer Practice. Twelve weeks; required; no credit. S**

Summer practice in architectural offices or with building contractors as the student may be registered in the Design Option or in the Construction Option. Required previous to registration for the fifth year.

**501. Design V. (0-15). Credit 5. I** †

Advanced architectural and planning problems, with emphasis on analysis, programming, research, site study, concept, consideration of related design fields, client contact and promotion. Prerequisite: Architecture 402.

**502. Design V. (0-15). Credit 5. II** †

Continuation of Architecture 501; problems of a more complex nature, with emphasis on awareness of office practice. Prerequisite: Architecture 501.

**527. Structural Systems. (2-3). Credit 3. I** †

Advanced studies in the systems of architectural structures. Prerequisites: Architecture 427, 428.

**528. Structural Systems. (2-3). Credit 3. II** †

Study of structural problems as related to actual professional practice; special consideration of design factors, new materials, codes, economy, specification surveys of costs. Prerequisite: Architecture 527.

**554. Professional Practice. (2-0). Credit 2. I, II** †

To familiarize the student with the usual problems of office practice, professional relations, ethics, building law and contracts. Prerequisite: Senior classification.

**556. City Planning. (2-3). Credit 3. I** †

Survey of planning principles and procedures; legal aspects; physical and social development of the city; housing. Prerequisite: Senior classification.

**581. Seminar. (1-0). Credit 1. II**

Seminars presented orally by students, faculty, and professional people, with subjects relating to architecture and the construction of buildings. Prerequisite: Fifth year classification.

## FOR GRADUATES

**627. Contemporary and Creative Structures. (2-2). Credit 3. I**

Studies and analyses of contemporary and creative structures as related to architectural design, with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 528 or the equivalent.

**628. Contemporary and Creative Structures. (2-2). Credit 3. II**

Continuation of Architecture 627. Studies and analyses of contemporary and creative structures as related to architectural design with emphasis on esthetic considerations, structural limitations and design, functional use, construction procedures and estimates of cost. Prerequisite: Architecture 627.

**629, 630. History and Archaeology. (2-0). Credit 2 each semester. I, II**

Individual problems of study and research in the field of American architecture and archaeology.

**681. Seminar. (1-0). Credit 1 each semester. I, II, S**

Review of current work in architecture; original presentation on selected topics.

**685. Problems. Credit 1 to 4. I, II, S**

Individual problems involving the application of theory and practice in the design and construction of buildings and groups of buildings.

**691. Research. Credit 2 to 4 each semester. I, II, S**

Research for thesis.

## LANDSCAPE ARCHITECTURE

**201. History of Landscape Design. (2-0). Credit 2. II**

A study of the art of landscape design from the earliest efforts to the present day. Lectures, reference reading, library sketches, and reports.

**300. Summer Practice. Ten weeks, required. No credit. S**

Approved summer practice with a recognized landscape architect or nursery.

**301. Introductory Landscape Design. (1-6). Credit 3. I**

Delineation of landscape forms; drafting, lettering and introductory composition, analysis and solution of typical site problems. Prerequisites: Architecture 102; Floriculture 207.

**302. Landscape Design and Construction. (1-6). Credit 3. II**

Topographical studies, grading problems, construction of steps, walks and other garden structures, specifications and working drawings. Prerequisites: Civil Engineering 208; Floriculture 207.

**305. Planting Design. (1-3). Credit 2. I**

The use of plant materials in the composition of landscape design. Study of the mass form and texture of plant materials in relation to one another as well as to structures and site development. Plans, sketches, and models. Prerequisite: Landscape Architecture 302.

**407. Landscape Maintenance. (1-3). Credit 2. I**

Principles of pruning, soil preparation, planting and transplanting practices, arboriculture, and pest control. Prerequisite: Floriculture 207.

**408. Park Management. (2-0). Credit 2. II**

A study of the history, location, administration, and maintenance of public parks, and present trends in the field of recreation as it pertains to these areas.

**409. Intermediate Landscape Design. (1-6). Credit 3. I**

Specific problems in the design of residential homesites, parks and general public areas. Plans, sketches, and models.

**410. Advanced Landscape Design. (1-6). Credit 3. II**

Design of public and semi-public properties, school sites, golf courses, parks, and cemeteries. Prerequisite: Landscape Architecture 409.

**411. Landscape Design for the Architect and Engineer. (2-2). Credit 3. I**

Designed to present the principles of, and technical requirements involved in the landscape development of residential, industrial, and other outdoor areas. Special emphasis is placed on the relationship of the architectural and engineering professions to such developments. Not open to students majoring in landscape architecture.

## Basic Courses

Director S. A. Kerley,
Professor D. F. Parry; Assistant Professors U. W. Crow, A. E. Denton, Jr.,
W. D. Kutach; Instructor R. L. Provost

**102. Remedial Reading. (0-3). Credit 1. I, II, S**

A laboratory course designed to remedy a student's reading disability and to increase his reading rate and comprehension. In addition to the regular two one-hour meetings per week, two thirty-minute practice periods are required.

**103. College Study. (0-2). Credit 1. I, II, S**

A laboratory course designed to familiarize the student with the principles of learning and to relate them to the study of specific school subjects.

**105. The World of Work. (0-2). Credit 1. I, II**

A course designed to familiarize the student who has not decided upon a vocational goal with the demands, required skills, and rewards of various occupational areas. Most of the major occupational areas will be studied intensively and each student will be given an opportunity for studying his aptitudes and interests and relating them to various vocational requirements.

**106. Survey of Man's Knowledge. (0-2). Credit 1. II**

A survey course designed to acquaint the student with the various schools of thought and the many areas of knowledge which comprise our culture. Such disciplines as philosophy, social and physical sciences, religion, law, and literature will be investigated.

## Department of Biochemistry and Nutrition

Professor C. M. Lyman,
Professors J. R. Couch, H. O. Kunkel, J. M. Prescott, Raymond Reiser,
L. R. Richardson; Associate Professors B. J. Camp, J. W. Dieckert

**312. Veterinary Physiological Chemistry. (3-6). Credit 5. I**

A study of the chemical nature of physiological processes, including the synthesis and breakdown of body tissues and the chemical changes undergone by metabolites from ingestion to excretion. Variations among domestic animals in normal and abnormal conditions will be considered. Prerequisite: Chemistry 228.

**401. Human Nutrition. (3-0). Credit 3. I** †

A study of the functions of food constituents in health and in physiological stress. The economic, national, and international aspects of human nutrition. Prerequisite: Junior classification.

**410. Introductory Biochemistry. (3-3). Credit 4. I** †

The chemistry of the major constituents of living organisms. Biophysical and biochemical processes in plants and animals are stressed. The laboratory work includes the application of quantitative analytical procedures to plant and animal tissues and fluids. Prerequisites: Chemistry 223 and 231 or 228.

**430. Electron Microscopy. (2-3). Credit 3. II** †

Descriptive treatment of various aspects of electron microscopy and laboratory practice employing selected specimens. Elementary discussion of electron optics, design of electron microscopes, photographic plates, underfocusing, overfocusing, asymmetry, colloidal state, shadow casting. Biological and physical science applications in all technical departmental fields of the College given equal attention. Prerequisite: Senior or graduate classification in a physical or biological science, or approval of the instructor.

**485. Problems. Credit 1 to 4. I, II, S**

A course for advanced undergraduates to permit laboratory investigations or the study of subject matter not included in established courses. Prerequisite: Approval of Head of the Department.

**Animal Husbandry 444. Large Animal Nutrition. (3-0). Credit 3. II** †

See Department of Animal Husbandry for a full description of this course.

**Poultry Science 411. Poultry Feeding. (3-2). Credit 4. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**601. Biochemistry of Plants. (3-0). Credit 3. I**

A study of the major groups of organic compounds occurring in plants with emphasis on their biological synthesis, physiological function, and changes in chemical structure due to metabolic processes. Prerequisite: Biochemistry and Nutrition 410 or 611. (Offered in 1961-62 and in alternate years thereafter)

**611. General Biochemistry. (3-0). Credit 3. I**

Chemistry of the principal constituents of living cells, with an introduction to intermediary metabolism. Prerequisites: Chemistry 207 or 316, 228.

**612. Laboratory Procedures in Biochemistry. (0-6). Credit 2. I**

A laboratory course designed to familiarize the student with the application of chemical and biological methods to the solution of fundamental biochemical problems. Prerequisite: Biochemistry and Nutrition 611 or registration therein.

**613. Vitamins. (3-0). Credit 3. II**

The role of vitamins in animal nutrition and their occurrence in plant and animal tissues. Prerequisite: Chemistry 228.

**614. The Determination of Vitamins and Minerals. (0-3). Credit 1. II**

A laboratory course designed to familiarize the student with methods for the determination of vitamins and minerals in biological materials. Prerequisite: Biochemistry and Nutrition 613 or registration therein.

**615. Experimental Animal Procedures. (0-3). Credit 1. II**

A laboratory course involving the management, preparation of purified rations, and the production and cure of nutritional diseases. Prerequisites: Biochemistry and Nutrition 613, 614 or registration therein.

**618. Chemistry and Metabolism of Lipids. (2-0). Credit 2. II**

An advanced course in lipid chemistry and metabolism. Prerequisite: Biochemistry and Nutrition 611.

**619. Proteins. (2-0). Credit 2. I**

Advanced studies on the chemical, physical, and biological properties of proteins. Particular emphasis will be placed on the biological synthesis and metabolism of proteins. Prerequisite: Biochemistry and Nutrition 611.

**620. Advanced Biochemical Techniques. (0-6). Credit 2. S**

A laboratory course involving practice in the use of special techniques and instruments employed in biochemical research and the isolation, identification, and analysis of biological compounds. Preparation of representative enzymes and laboratory work on factors affecting their action. Prerequisites: Biochemistry and Nutrition 612, 624.

**624. Enzymes. (2-0). Credit 2. II**

General principles of enzyme chemistry. The physical chemistry of enzyme action. Types of enzymes and coenzymes. Enzymes in the patterns of metabolism. Prerequisites: Biochemistry and Nutrition 601 or 611; Chemistry 324 or 342; or approval of instructor.

**626. Radioisotopes Techniques. (2-3). Credit 3. I**

A general course on the nature and utilization of isotopes in chemical and biochemical studies. History, general properties of nuclei, nuclear reactions, radiations; health physics and instrumentation will be included. Prerequisites: Chemistry 316, 317; Physics 201, 202.

**627. Mineral Nutrition and Metabolism. (2-0). Credit 2. II**

A study of the role of minerals in animal nutrition with emphasis on physiological function, biochemical interrelationships with other minerals and other nutrients, deficiency symptoms and nutritional significance. Prerequisite: Biochemistry and Nutrition 410 or 611.

**628. Biochemical Preparations. (0-6). Credit 2. S**

A laboratory course dealing with the isolation and synthesis of organic compounds which are important in biological systems. Particular emphasis is placed on recent techniques of isolation. Prerequisite: Biochemistry and Nutrition 612.

**630. Metabolism. (3-0). Credit 3. II**

A descriptive consideration of the various chemical pathways of metabolism. Prerequisites: Biochemistry and Nutrition 611, 613.

**632. Radioactive Tracer Techniques in Metabolism. (1-3) or (1-6). Credit 2 or 3. II**

The use of isotopes in measuring the metabolic pool, precursor-product relationships, isotopic competition, cycles and intermediates, isotopic dilution and double dilution, permeability, adsorption and absorption and assay of common elements. Prerequisites: Biochemistry and Nutrition 611, 612, 626, or approval of instructor.

**640. Clinical Chemistry. (2-6). Credit 4. II**

A study of the quantitative distribution of body constituents and their physiological interpretations. Prerequisites: Biochemistry and Nutrition 312 or 410 or 611, or Biology 433, or Veterinary Physiology and Pharmacology 427.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

The study and discussion of original articles in biochemistry and nutrition and related fields designed to broaden the understanding of problems in the field and to stimulate research.

**685. Problems. Credit 1 or more each semester. I, II**

An advanced course in biochemical laboratory procedures including preparations and instrumentation. Problems assigned according to the experience, interests, and needs of the individual student.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Laboratory facilities are available for original investigations in various phases of biochemistry and nutrition. Prerequisite: Approval of major advisor.

**Genetics 631. Biochemical Genetics. (2-0). Credit 2. I**

See Department of Genetics for a full description of this course.

## Department of Biology

Professor J. G. Mackin,
Professors S. O. Brown, W. J. Dobson, H. L. Gravett, S. H. Hopkins, Charles La Motte, G. E. Potter, J. J. Sperry; Associate Professors L. S. Dillon, E. H. Gibbons, G. M. Krise, A. B. Medlen, N. P. Wood; Assistant Professors W. J. Clark, F. H. Kasten, C. E. Miller; Instructor W. V. Robertson

Courses in the biological sciences administered by the Department of Biology include sequential programs in botany, microbiology, and zoology. All courses, irrespective of subject matter area, bear the departmental designation, (Biology) and a course number from a single numerical sequence. The nature of the offerings is more clearly indicated, however, by the subject matter grouping shown on the following pages.

### GENERAL BIOLOGY

**115. Survey of Biology. (3-3). Credit 4. I, II**

A summarization of biological forms and principles and their impact upon man and his affairs.

**225. Personal and Public Health. (2-0). Credit 2. I**

A general introduction to personal and community health. Designed primarily to enable the individual to utilize available knowledge and facilities to raise the health standard of his home and community.

**330. Life Science. (2-0). Credit 2. I, II**

Readings of grouped essays covering fifteen of the major subdivisions of life science together with integrating lectures designed to fit each into its place in life and industry. Prerequisite: Junior classification. (Not open to those with more than 7 hours of credit in biology.)

**337. Organic Evolution. (2-0). Credit 2. I, II**

A study of the evidences of the evolution of plants, animals, and man. Phylogeny and interrelationships of living things, the main lines of evolution, variation and the origin of species will be studied; man and the future considered.

**439. The Development of the Biological Sciences. (2-0). Credit 2. II**

A survey of the beginnings and development of biological discoveries and the lives and contributions of men who were outstanding in the general field of biology before 1900. Prerequisite: Fifteen hours of biological science.

**481. Seminar in Biology. (1-0). Credit 1. I** †

Recent advances. For graduates and advanced undergraduate majors in either microbiology, botany, or zoology. May be repeated once for credit not to exceed two hours.

**482. Seminar in Biology. (1-0). Credit 1. II** †

Integration of the branches of biological science. May be repeated once for credit not to exceed two hours.

**485. Biological Problems. Credit 1 to 4. I, II**

Problems in the various phases of plant, animal, and bacteriological science. Prerequisites: Junior classification; approval of ranking professor in field chosen.

## FOR GRADUATES

**600. Teaching of High School Biology. (2-3). Credit 3. S**

A study of the problems and techniques of teaching biology in the secondary school, along with appropriate subject matter. The laboratory work emphasizes those exercises, projects, and materials which are most useful in the high school biology laboratory and in stimulating interest in the subject. Prerequisite: Approval of the Heads of the Biology and Education and Psychology Departments.

**654. Radiation Biology. (3-0). Credit 3. II**

Lecture and demonstration reviewing the physical theory of radiations important to living organisms with especial emphasis on ionizing radiation: X-ray, gamma, alpha, beta and neutron. Survey of the effects of ionizing radiations on biological systems. Prerequisite: Graduate classification in biological or agricultural science.

**660. Aquatic Ecology. (2-3). Credit 3. II**

A study of fresh water as an environment; its physical and chemical characteristics; the plant and animal communities which inhabit it; and the mechanisms by which the physical and chemical characteristics and the interactions of the biological populations affect the distribution, population dynamics, and productivity of the aquatic organisms. Prerequisites: Biology 327 and 435 or the equivalent; graduate classification or approval of the instructor.

**661. Cellular Physiology. (2-3). Credit 3. I**

A consideration of the physiochemical nature of the cell and its relationship to the environment with emphasis on conversion of energy and matter as required by the cell as a living unit. Prerequisites: Graduate classification in biology or animal or plant science; approval of the instructor.

**681. Seminar. (1-0). Credit 1. I, II**

Detailed reports on specific topics in the field chosen. Prerequisite: Graduate classification in the appropriate field.

**685. Problems. Credit 1 to 4 each semester. I, II**

Limited investigations in fields other than those chosen for thesis or dissertation.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation. Prerequisite: Approval of ranking professor in the field chosen.

## BOTANY

**101. General Botany of Seed Plants. (2-3). Credit 3. I, II**

The seed plant as a living unit; external and internal structures in relation to life processes; reproduction and life history.

**102. Taxonomy of Flowering Plants. (2-3). Credit 3. I, II**

Designed to give training in the use of keys and in the identification of flowering plants, family characteristics and relationships, and other applied phases of plant science. Prerequisite: Biology 101.

**327. Fundamental Plant Morphology. (2-3). Credit 3. I**

Structural, reproductive, and taxonomic features of representatives of the major plant groups, with particular attention to groups not covered in Biology 101. Prerequisite: Biology 101.

**349. Plant Taxonomy. (2-3). Credit 3. S**

Study and identification of the flora of selected areas, techniques of collection and preparation of plant specimens. Studies in plant distribution and relationships. Prerequisite: Biology 101 or 115.

**353. Mycology. (2-3). Credit 3. II** †

An introduction to the study of fungi, including structure, reproduction, ecological relationships, and taxonomic aspects. Prerequisites: Biology 101, 206, or approval of instructor. (Offered in 1962-63 and in alternate years thereafter.)

**453. Plant Anatomy. (2-3). Credit 3. I** †

Fundamental anatomy of the vegetative and reproductive organs of the plant with emphasis on development of tissue types. Technique of staining and mounting of plant tissues. Prerequisite: Six hours of plant sciences including Biology 101 or the equivalent.

## FOR GRADUATES

**608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

A study of the form, structure, reproduction, and ecology of the algae, with detailed work on selected locally available forms, both marine and fresh water. Prerequisite: Biology 327 or 353 or approval of the instructor. (To be offered in 1960-61 and in alternate years thereafter.)

**615. Cytology. (2-6). Credit 4. I**

An intensive study of the organization and activities of the cell, with emphasis on topics related to cytogenetics and cytotaxonomy. Prerequisites: Genetics 301; approval of the instructor.

**619. Systematic Botany. (2-6). Credit 4. I, II**

Principles of taxonomy. Phylogenetic considerations and criteria used in schemes of classification. History of classification. Nomenclature and identification. Field and herbarium techniques. Prerequisites: Biology 102, 327, or approval of the instructor.

**620. Systematic Botany. (2-6). Credit 4. I, II**

Survey of Angiosperms with emphasis on relationships. Biosystematics and modern taxonomy. Procedures in monograph preparation. Monographers. Field and herbarium techniques with problems designed for individual needs and interests. Prerequisite: Biology 619. (Offered in 1961-62 and in alternate years thereafter.)

**623. Plant Morphology. (2-6). Credit 4. II**

A study of the anatomical, reproductive, and organogenetic features of representative vascular plants; emphasis on economic forms. Prerequisite: Biology 327 or the equivalent.

**651. Mycology. (2-6). Credit 4. II**

Detailed studies of the fungi, with emphasis on life cycles of representative forms; genetics and cytology; principles of taxonomy; ecology and geographical distribution. Actinomycetes and lichens are also considered. Prerequisite: Biology 353 or approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

## MICROBIOLOGY

A major in microbiology offers thorough and comprehensive training in the biology of bacteria and certain of the algae, fungi, and protozoa that supplement the study of the microorganisms in their relation to medicine, industry, and agriculture. The curriculum is intended to equip the student with sound training in the principles of microbial life, as either preparation for graduate study or for a career in either industrial or civil service.

**206. Introductory Microbiology. (2-4). Credit 3. I, II**

Relation of microorganisms to agriculture, industry, and health of man, animals, and plants. Prerequisites: Chemistry 102; 3 hours of biology.

**438. Bacterial Physiology. (2-6). Credit 4. I**

A detailed study of the physiological activities of bacteria. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1960-61 and in alternate years thereafter.)

**457. Bacterial Ecology. (2-6). Credit 4. II** †

Relation of bacteria to their environment, especially to other microorganisms. Methods of isolation, identification, and differentiation. Prerequisite: Biology 206. (Offered in 1960-61 and in alternate years thereafter.)

**Biology 353. Mycology. (2-3). Credit 3. II** †

See page 258 for a full description of this course.

**Dairy Science 320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

See Department of Dairy Science for a full description of this course.

**Dairy Science 326. Food Preservation and Decomposition. (3-3). Credit 4. II** †

See Department of Dairy Science for a full description of this course.

**Veterinary Microbiology 435. Microbiology and Immunology. (3-4). Credit 4. I** †

See Department of Veterinary Microbiology for a full description of this course.

**Veterinary Microbiology 436. Pathogenic Microbiology. (3-3). Credit 4. II** †

See Department of Veterinary Microbiology for a full description of this course.

### FOR GRADUATES

**608. Ecology and Taxonomy of the Algae. (2-6). Credit 4. II**

See page 258 for a full description of this course.

**635. Physiology of Microorganisms. (2-6). Credit 4. I**

An advanced consideration of the physiological activities of bacteria with special emphasis on metabolism. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1960-61 and in alternate years thereafter.)

**647. Industrial Microbiology. (2-6). Credit 4. II**

Microorganism as the basis of industrial processes. Practice includes antibiotic assay; analysis of products of metabolism, and fermentation balances. Prerequisites: Biochemistry and Nutrition 312 or 410; Biology 206. (Offered in 1961-62 and in alternate years thereafter.)

**Biology 630. Protozoology. (3-3). Credit 4. II**

See page 261 for a full description of this course.

**Biology 651. Mycology. (2-6). Credit 4. II**

See page 258 for a full description of this course.

**Plant Physiology and Pathology 607. Physiology of the Fungi. (3-0). Credit 3. II**

See Department of Plant Physiology and Pathology for a full description of this course.

**Plant Physiology and Pathology 618. Bacterial Plant Diseases. (2-3). Credit 3. II**

See Department of Plant Physiology and Pathology for a full description of this course.

**Plant Physiology and Pathology 620. Plant Viruses. (2-0). Credit 2. I**

See Department of Plant Physiology and Pathology for a full description of this course.

## ZOOLOGY

**107. Vertebrate Zoology. (2-3). Credit 3. I, II**

Structure, physiology, and development of animals; emphasis on the biology of vertebrates.

**108. Invertebrate Zoology. (2-3). Credit 3. I, II**

Classification, comparison, anatomy, and physiology of invertebrate animals. Specimens from the more important invertebrate phyla are studied in the laboratory. Prerequisite: Biology 107 or approval of instructor.

**217. Comparative Anatomy of Vertebrates. (2-4). Credit 3. I**

Comparative anatomy of the Prochordates and the lower vertebrates through Reptilia. Laboratory animals: Molgula, Dolichoglossus, Amphioxus, Squalus, Necturus, and Phrynosoma. Prerequisites: Biology 107, 108.

**218. Comparative Anatomy of Vertebrates. (2-4). Credit 3. II**

Comparative anatomy of birds and the mammals. Laboratory animals: the chicken and the cat. Prerequisite: Biology 217.

**219. Mammalian Anatomy. (2-3). Credit 3. I**

Principles of normal anatomy of cat and man. Nature and causes of mechanical injuries of man. Prerequisite: Biology 107.

**220. Physiology and Hygiene. (2-3). Credit 3. II**

A continuation of Biology 219. Normal and abnormal physiology of man. Prerequisite: Biology 219.

**325. Physical Anthropology. (3-0). Credit 3. II**

Man's relation to and position in the animal kingdom. Physical characteristics of mankind. Fossil and living types. Races and racial characteristics. Somatotypes. Prerequisite: Three hours of biological science.

**335. Gross and Microscopic Vertebrate Anatomy. (2-3). Credit 3. I**

Study of selected features of anatomy, embryology, and histology with emphasis on higher vertebrates. Although the cat is used as the laboratory animal, another vertebrate may be chosen if warranted and approved by the instructor. Prerequisite: Biology 107 or the equivalent.

**343. Histology. (2-3). Credit 3. I** †

Normal tissues of vertebrates including histogenesis of some. Histogenesis and organography of mammalian tissues reviewed. Prerequisite: Biology 217 or 335.

**344. Embryology. (2-3). Credit 3. II** †

Introduction to general and comparative vertebrate embryology; emphasis on early development of frog, chick, and pig. Prerequisite: Biology 217 or 335.

**422. Microtechnique. (1-6). Credit 3. II** †

Standard methods in the preparation of permanent microscopic slides of plant and animal tissues. Prerequisite: Twelve hours of biological science.

**433. General Physiology. (3-3). Credit 4. I** †

Fundamental physiology of protoplasm; basic processes and functions of organs and systems. Emphasis is placed on digestion, respiration, metabolism, excretion, muscular contraction, and reproduction. Prerequisites: Biology 107 and either graduate classification, Biology 218, or the equivalent.

**434. Circulatory and Nerve Physiology. (2-3). Credit 3. II** †

Comparative functions of the circulatory, nervous system, and of the organs of special sense. Prerequisites: Biology 218; or Biology 107 and senior or graduate classification in an animal science.

**435. Advanced Invertebrate Zoology. (3-3). Credit 4. I** †

Morphology, taxonomy, biology, and phylogeny of invertebrate animals. Prerequisite: Biology 107 or approval of the instructor.

**436. Animal Parasitology. (3-3). Credit 4. II** †

Study of parasitic worms and protozoa; laboratory methods in parasitology. Prerequisite: Biology 435 or equivalent.

## FOR GRADUATES

**603. Advanced Vertebrate Zoology. (1-5). Credit 3. II**

Phylogeny of vertebrates based on comparative anatomy, histology, embryology, and distribution. Prerequisites: Biology 218, 343, 344, or the equivalent.

**604. Advanced Embryology. (1-5). Credit 3. I**

Comparative and experimental studies of the mechanics of embryonic development. Prerequisites: Biology 218, 343, 344, or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**627. Helminthology. (3-3). Credit 4. I**

A study of the parasitic worms, especially Trematoda, Cestoda, Nematoda, and Acanthocephala. Prerequisite: Biology 436. (Offered in 1960-61 and in alternate years thereafter.)

**630. Protozoology. (3-3). Credit 4. II**

Morphology, taxonomy, physiology, reproduction, phylogeny, ecology, and life history of both free living and parasitic protozoa. May be taken concurrently with parasitology. Prerequisite: Biology 108. (Offered in 1961-62 and in alternate years thereafter.)

**632. Methods in General Physiology. (2-6). Credit 4. II**

Methods for the quantitative study of metabolism, respiration, circulation, excretion, movement, and other basic physiological phenomena. Recent advances in physiological methods to be presented on a seminar basis. Prerequisite: Biology 433 or the equivalent.

**649. Biology of the Endocrine Glands. (3-3). Credit 4. I**

A study of the structure, development, comparative anatomy, and physiology of the endocrine glands of the different animal groups. Prerequisites: Three hours of either anatomy or anatomy and physiology.

**653. Zoogeography. (3-0). Credit 3. II**

A study of the distribution of animals during geologic and present times; emphasis on the role of ecology and the effects of geography upon terrestrial and marine distribution. Prerequisite: Twelve hours of biological sciences, including at least 3 hours of advanced courses.

**656. Analytical Histology. (2-6). Credit 4. II**

Designed to acquaint the student with certain quantitative histochemical techniques in plant and animal science as applied to nucleoproteins, carbohydrates, lipids, and enzymes. Presentation of cytological evidences which aid in localizing the activities of nucleoproteins in cell metabolism. Prerequisites: Biology 343 or 453 or the equivalent; Chemistry 227.

## Division of Business Administration

Professor T. W. Leland,
Professor P. B. Goode, T. R. Hamilton, S. C. Hoyle, Jr., R. M. Stevenson, T. R. Yantis; Associate Professors R. L. Elkins, H. G. Kenagy, T. D. Letbetter, W. S. Manning, E. S. Packenham, J. E. Roche, N. A. Stewart, Jr., H. G. Thompson, Jr., W. E. Whittington, R. P. Wood; Assistant Professors R. D. Amason, J. H. Dozier, W. E. Eckles, J. E. Oliver, J. L. Sandstedt, L. H. Taylor, Jr., R. D. Thompson; Instructors J. D. Ingram, D. C. Lowe, H. F. Lyles, W. L. Thornton

**105. Introduction to Business. (3-0). Credit 3. I, II**

Provides an over-all picture of business operations, develops a business vocabulary, and directs the thinking of each student to the field of business best suited to his interest and talent. Subject matter includes an analysis of the specialized fields within the business organization and of the role of business in modern society.

**205. Marketing. (3-0). Credit 3. I, II, S**

A study of institutions, processes, and problems involved in tranferring goods from producers to consumers, with emphasis on economic and social aspects.

**206. Purchasing and Control of Materials. (2-0). Credit 2. I, II, S**

Operation of a purchasing department in a manufacturing business; organization of the department; specifications, standards, contract provisions; sources of supply; methods of perpetual inventory.

**208. Advertising. (3-0). Credit 3. I, II**

Place of advertising in business; advertising media, such as the newspaper, tradepaper, magazine, direct mail, poster, and the radio; description of the various methods of advertising; development of copy and layout of advertisements; consumer habits and psychology; methods of investigations for advertising campaigns; cost of advertising; legal and ethical problems involved in advertising; consideration of advertising from the standpoint of consumers. Prerequisites: Business Administration 205; Economics 203.

**216. Building Products. (0-2). Credit 1. II**

A study of building products, their physical properties, and their markets. Prerequisite: Business Administration 205.

**227. Principles of Accounting. (3-3). Credit 4. I, II, S**

An introductory course designed to serve as a foundation for study of advanced accounting and to furnish a knowledge of accounting which will be of value to students in other fields. The subject matter includes: analysis and recording of business transactions; use of journal and ledger; trial balance and work sheet; adjusting and closing entries; accounting statements; payroll records and payroll taxes; introduction to partnership accounting; special journals and ledgers; business papers and business procedures related to accounting; voucher system.

**228. Principles of Accounting. (3-3). Credit 4. I, II, S**

A continuation of Business Administration 227. Internal control; partnership and corporation accounting; accounting for manufacturing concerns; analysis and interpretation of statements. Prerequisite: Business Administration 227.

**303. Statistical Method. (3-3). Credit 4. I, II, S** †

Collection, tabulation, presentation, and analysis of data. A study of sampling, graphics, averages, ratios and coefficients, dispersion, skewness, probability and error, index numbers, seasonal and long-time trend, barometers, correlation. Prerequisite: Mathematics 102.

**304. Business Cycles and Business Measurements. (3-0). Credit 3. I, II, S** †

An empirical and statistical study of economic fluctuations; theory, causes and control of business cycles; business barometers and forecasting. Study of economic and statistical services. Prerequisite: Business Administration 303.

**305. Business Law. (3-0). Credit 3. I, II, S** †

Nature and scope of law; court system; homestead and exemption laws of Texas; law of contracts; principal and agent; business organizations, including partnerships and corporations; the Texas community property laws. Prerequisite: Sophomore classification.

**306. Business Law. (3-0). Credit 3. I, II, S** †

Additional studies in the law of business, dealing with bailments, carriers, mortgages, suretyships, negotiable instruments, banks and banking, wills and estates, sales, bankruptcy. Prerequisite: Business Administration 305.

**308. Law of Private Corporations. (3-0). Credit 3. I, II** †

Powers and limitations of the corporate form of business organization as distinguished from other forms of business enterprise. Legal problems encountered in formation, management, financing, and dissolution of corporations. Rights of corporate stockholders and creditors. Legislative control under state and federal statutes. Prerequisite: Business Administration 306.

**310. Credits and Collections. (2-0). Credit 2. II**

The elements of mercantile and consumer credit; organization of a credit department; sources of credit information; collection tools and procedures.

**312. Statistical Charts and Graphs. (2-0). Credit 2. II**

Graphic presentation of statistical data, construction of charts, calculating charts and nomographs, statistical maps, rate of change analysis, visual aids in presenting business reports. Prerequisite: Business Administration 303. (Offered in 1960-61 and in alternate years thereafter.)

**315. Insurance. (3-0). Credit 3. I, II, S**

A general introductory course dealing with the theory and practice of insurance and its economic and social significance. A critical examination is made of the various types of life, fire, and automobile contracts available for protection against personal and business risks. In addition a brief study is made of state and federal insurance plans, suretyship, and other casualty and property coverages. Prerequisite: Sophomore classification.

**316. Office Management. (2-0). Credit 2. I, II, S**

The problem of office management; the function of the office manager; office systems, handling of correspondence, filing, mailing; office furniture and equipment; office forms and supplies and their control; the office building and the office layout; selection, training, and compensation of office personnel; office manuals and reports; budgetary control in the office.

**317. Punch Card Methods. (1-2). Credit 2. I, II, S**

Instruction and practice in the operation of punch card machines for the handling of accounting and statistical data. Prerequisites: Business Administration 228, 303.

**318. Wholesale Merchandising. (3-0). Credit 3. I, II**

A presentation of the basic principles and economic functions of the wholesaler. Also a study of the modern wholesaling systems and the operation and management of a wholesale business. Prerequisites: Business Administration 205; junior classification.

**320. Life Insurance. (3-0). Credit 3. I** †

This basic life insurance course presents the fundamentals of life insurance and annuities for the future life underwriter. The economic background of life insurance, and the various life insurance and annuity contracts are discussed relative to their utilization in private life and business. Included are fundamentals of rate-making, reserves, cash surrender values, dividends, and the selection of risks. Prerequisite: Business Administration 315.

**322. Property Insurance. (3-0). Credit 3. I** †

A study of the principles and practices of property insurance designed for those who enter either the property and casualty insurance or property management fields. The course includes fire and allied lines contracts, consequential losses, protection of the mortgagee, transportation insurance (both ocean and inland), multiple line contracts, and rate-making. Prerequisite: Business Administration 315.

**324. Casualty Insurance and Suretyship. (3-0). Credit 3. II** †

This course places emphasis upon the principles of casualty insurance and surety bonding. Employer's liability insurance is studied in conjuction with workmen's compensation insurance. The liability risks of business, professional, and personal activities are discussed. Theft, disability, aviation, glass, power plant, and credit insurance are discussed. Prerequisite: Business Administration 315.

**325. Retailing. (3-0). Credit 3. I, II, S**

Fundamental operations of retailing concerns and the need for effective coordination of retailing activities. Prerequisites: Business Administration 205; Economics 203, 204.

**327. Intermediate Accounting. (2-3). Credit 3. I, S**

Working papers and preparation of statements; correction of books and statements; special phases of corporation accounting; cash and receivables; inventories, investments. Prerequisite: Business Administration 228.

**328. Intermediate Accounting. (2-3). Credit 3. II, S**

Investments; tangible and intangible fixed assets; liabilities; reserves; statement analysis; statement of application of funds; cash-flow statement; statements from incomplete records; quasi-reorganizations, business combinations, divisive reorganizations; income tax allocation; price-level impact on financial statements. Prerequisite: Business Administration 327.

**329. Elementary Cost Accounting. (3-0). Credit 3. I, II, S**

Development of cost accounting principles relating to material, labor, and manufacturing expenses; basic cost accounting practices and procedures, with special emphasis on job order costing; survey of principles and practices of process cost accounting. Prerequisite: Business Administration 228.

**330. Advanced Accounting. (3-0). Credit 3. I, S** †

Special phases of partnership accounting; joint ventures; consignments; installment sales, accounting for insurance costs; statement of affairs and accounting for insolvent concerns; compound interest; home office and branch accounting. Prerequisite: Business Administration 328 or registration therein.

**332. Cost Accounting. (3-0). Credit 3. II, S**
Advanced process cost procedures, costing of joint and by-products, estimated cost, standard costs, managerial reports and analysis for cost control, direct costing, break-even analysis. Prerequisite: Business Administration 329.

**337. Data Processing. (2-2). Credit 3. I, II**
Use of electronic computers for recording and reporting, sorting; searching; collating; file maintenance; integrated data processing; coding of information; tables and approximations; storage of information; practical application. Prerequisite: Junior classification.

**344. Marketing Problems. (3-0). Credit 3. II** †
A study of the problems involved in the marketing of industrial and consumer goods; the problems connected with customer relations, channels of distribution, brands, sales promotion, pricing, and legislation. Prerequisite: Business Administration 325.

**352. Personal Finance. (2-0). Credit 2. I, II**
Personal and family accounts; budgets, budgetary control; bank accounts; charge accounts; borrowing; investing; insurance; standards of living; renting; home ownership; wills, trust plans. Not open to business administration students for credit.

**402. Accounting Systems. (2-0). Credit 2. II** †
Survey of accounting systems in current use by different types of businesses. System design and installation. Manual and machine procedures. Prerequisite: Business Administration 328.

**403. Income Tax. (3-0). Credit 3. I, II** †
Income tax legislation; the present income tax law and regulations; treasury decisions, court decisions, and departmental rulings; income tax problems and returns. Prerequisite: Business Administration 327.

**406. Managerial Accounting. (3-0). Credit 3. II** †
A study of the uses of accounting information by management. Emphasis is placed on accounting procedures and reports essential to management. Cost analysis, cost control, budgeting and controllership. Prerequisite: Business Administration 329.

**407. Auditing. (3-0). Credit 3. I** †
Auditing procedures used by internal auditors and independent public accountants; preparation of working papers. Prerequisites: Business Administration 328, 329.

**408. Auditing. (3-0). Credit 3. II** †
A continuation of Business Administration 407. Work on an audit practice case with preparation of working papers and audit report, case studies involving auditing problems in special situations. (Required of students who plan to enter public accounting.) Prerequisite: Business Administration 407.

**409. Survey of Accounting Principles. (3-0). Credit 3. I, II, S** †
A survey of accounting designed for students majoring in engineering and architecture. The course provides for a survey of accounting procedures, basic elements of cost accounting, and the preparation and interpretation of financial statements. The course is not as comprehensive as Business Administration 227, 228, is not open to students in business administration, agricultural administration, or liberal arts. Prerequisite: Junior classification.

**416. Oil Production Accounting. (3-0). Credit 3. II**
A study of the systems and procedures for the acquisition of undeveloped oil properties, development of oil properties, and production of crude oil. Emphasis is placed upon the work in the accounting department of a crude oil producing company and the accounting treatment of intangible development costs, depletion allowance, and oil pipe line operations. Prerequisites: Business Administration 227, 228.

**418. Corporation Finance. (3-0). Credit 3. I, II, S** †

A survey of the principles underlying the financial practices and financial management of the modern business corporation. A study will be made of advantages and disadvantages of the corporation, sources of long-term and short-term credit, working capital, surplus and dividend policy, expansion and combination problems, and failure and reorganization. Prerequisite: Economics 203 or the equivalent.

**420. Principles of Investment. (3-0). Credit 3. I, II, S** †

An analysis of the character of various investment risks, comparison of investment media, and a study of the securities market. Theories and financial tools vital to decision making concerning the structure of the security portfolio and changes in that structure to adapt most advantageously to changing economic conditions and particular needs are investigated. Prerequisite: Business Administration 418.

**422. Personnel Problems of Industry. (3-0). Credit 3. I, II, S** †

The relation of the worker to his employer, the methods of job finding, interviewing aids, occupational trends, scientific management, the functions and structure of personnel departments, employee welfare activities, and other problems of contemporary industrial development. Prerequisite: Junior classification.

**423. Personnel Policies and Techniques. (3-0). Credit 3. I, II, S** †

Programs and agencies which workers and employers have developed to improve their economic and social status; job analysis, description, and classification; wage and salary problems and procedures; personnel records. Prerequisite: Business Administration 422.

**427. Insurance Law. (3-0). Credit 3. II** †

Law cases on insurance to develop an understanding of the methods of administrative control by the state; typical clauses of insurance policies and their interpretation by the courts; technical legal pitfalls; case examples from all forms of insurance coverage; Texas insurance law. Prerequisite: Business Administration 305.

**428. Real Estate Titles and Conveyances. (3-0). Credit 3. I, II, S** †

The ownership and transfer of titles to real property, including deeds, easements, urban and rural property with special attention to zoning, building codes, private restrictions and conditions. The law of fixtures, timber and crops, mortgages and liens, building contracts, plans and specifications, performance bonds, mines and minerals, contracts of sale, escrow and earnest money agreements, real estate brokers, sufficiency of property description, and other matters related to real property. Prerequisite: Business Administration 305.

**430. Cost Accounting Survey. (3-0). Credit 3. II, S** †

An introductory cost accounting course following Business Administration 409, for architects, engineers, and agricultural students. Purposes and uses of cost accounting; elements of cost; unit costs for use in bidding on contracts; comparison of cost procedures; job order and process costs, budgets, and standard costs; cost reports. Prerequisite: Business Administration 409.

**432. Security Analysis. (3-0). Credit 3. II** †

Methods of analyzing individual security issues, establishment of principles of selection and protection of security holdings, setting up sound and workable tests of safe investments including financial statement analysis, understanding rights and interests of investors in senior securties and owners of common stock. Prerequisite: Business Administration 420.

**433. Business Management. (3-0). Credit 3. I, II, S**

The course deals with fundamental concepts and principles of business organization and management. The functions of planning, organizing, motivating, and controlling are examined relative to their application to firms of varying size and nature. Problems inherent in organizational relationships are appraised and possible solutions are developed and discussed. Prerequisite: Junior classification.

**434. Problems in Finance. (3-0). Credit 3. II** †

The course presents a series of comprehensive financial problems confronting the management of large and small businesses. The analysis and solution of the problems utilize the techniques and methods acquired in previous courses. The case system is used to give the student practice in linking up the related legal, accounting, and financial aspects of each situation. Prerequisite: Business Administration 418.

**435. Salesmanship. (3-0). Credit 3. I, II, S**

A consideration of the general principles of successful personal selling. Particular attention is given to personal requisites, qualifications, and training programs to enable the student to become a successful salesman. Prerequisites: Business Administration 205; Economics 203, 204.

**436. Sales Management. (3-0). Credit 3. II, S** †

A consideration of the problems confronting the modern sales executive; organization of sales departments, product research, selection and recruiting; compensation plans, routing, supervision, and costs connected with sales administration. Prerequisite: Business Administration 435.

**437. Applied Life Insurance. (3-0). Credit 3. II** †

This course presents the legal and social aspects of life insurance. Problems of reinsurance, company organization, and financial position are examined within their regulatory framework. Consideration is given to all forms of government life insurance and the benefits under the Social Security Act. A study of the elements of programming and the fundamental uses of settlement options are included. Prerequisite: Business Administration 320.

**440. Real Estate Fundamentals. (3-0). Credit 3. I**

Basic factors and agencies which comprise the structure of our modern real estate development. A study of the historic, economic, legal, and financial aspects of realty and the effect of their interplay on the institution of real property, both urban and rural. Designed for the home and business property owner as well as for the professional real estate man.

**442. Real Estate Practice. (3-0). Credit 3. II**

A study of the practical techniques and procedures employed in real estate transactions, with emphasis on real estate appraisal, sales, finance, and industrial property management. Prerequisite: Business Administration 440 or approval of the instructor.

**445. Marketing Research. (3-0). Credit 3. I** †

A study of the nature and uses of marketing research in business. Emphasis is on methods of collecting and interpreting marketing information and specific application to problems in marketing. Prerequisites: Business Administration 205, 303.

**446. Marketing Industrial Products. (2-0). Credit 2. II** †

Management aspects and economic factors affecting marketing policies are considered. Special emphasis is given to marketing research, marketing policies, channels of distribution, brand policy, pricing and control of marketing operations as they affect industrial products. A term project involving a report on the marketing of a specific industrial product is required of each student. Prerequisites: Business Administration 205, and Business Administration 303 or Mathematics 116.

**447. Advertising Procedures. (3-0). Credit 3. I**

Study of advertising procedures for newspapers, magazines, radio, and television. Specific topics include retail, mail order, national, and industrial advertising; advertising agencies; advertising research; and advertising campaigns. Prerequisite: Business Administration 208.

**452. Veterinary Jurisprudence. (3-0). Credit 3. II**

A study of Texas statutes and court decisions regulating and affecting the practice of veterinary medicine. One of the primary functions of this course is to prepare the student for the State Board Examination in veterinary law. Prerequisite: Senior classification in the School of Veterinary Medicine.

**456. Applied Salesmanship. (0-2). Credit 1. II**

A practical course in personal salesmanship. Analysis of specific products; planning and execution of the interview; psychological aspects of selling. Particular stress is made on sales demonstration and the strategy involved in closing the sale. Prerequisites: Business Administration 435; English 403.

**461. Retailing Building Products. (2-0). Credit 2. I**

A study of the special problems of the dealers in building products. Prerequisite: Business Administration 325.

**463. Employee Supervision. (2-0). Credit 2. II** †

A study of the relationships of the first level of management to supervisors and to the staff. The objectives, organization, and tools of the supervisory level; how to handle problems of grievances, absenteeism, discipline, morale, induction, safety, and training of workers. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Statement Analysis. (3-0). Credit 3. II, S**

An analytical study of the different kinds of statements for the guidance of executives, investors, and creditors; balance sheet and profit and loss ratios. Prerequisite: Business Administration 327 or 430.

**602. Consolidated Statements. (2-0). Credit 2. II**

Consolidated balance sheets, consolidated income and surplus statements, holding companies, mergers. Prerequisite: Business Administration 330. (Offered in 1960-61 and in alternate years thereafter.)

**603. Price Analysis. (3-2). Credit 4. I, S**

Economic concepts relating to prices, statistical methods of analyzing prices, supply and demand curves, elasticity of demand, price forecasting, study and criticism of works on price analysis. Term paper required on factors affecting the price of a commodity. Prerequisites: Business Administration 303; Economics 203, 204.

**604. Statistics. (3-2). Credit 4. II, S**

Curve fitting and empirical formulas. Multiple correlation, mathematical and graphic. Sampling and measures of unreliability. Chi-square test. Analysis of variance and covariance. Prerequisites: Business Administration 303; Mathematics 102. Mathematics 110 is recommended.

**605. Accounting Problems. (3-0). Credit 3. I**

A study of advanced accounting theory and problems dealing primarily with corporation accounting, assets and liabilities, analysis of statements, and cost accounting. The problems considered will be of the type currently stressed in accounting examinations. Prerequisite: Approval of instructor.

**606. Accounting Problems. (3-0). Credit 3. II**

A continuation of Business Administration 605. The topics will deal primarily with partnerships, fiduciaries, home office and branch, insurance, and auditing. Prerequisite: Approval of instructor.

**607. Market Analysis. (3-0). Credit 3. I**

A critical analysis of selected problems in the field of marketing. Each member of the class will be required to present a term report on some specific problem in the field of distribution. Prerequisites: Business Administration 205, 303.

**609. Management Seminar. (3-0). Credit 3. I, S**

A case study course covering the interrelated functions of production, distribution, and finance. Problems and situations confronting top and middle management are critically examined. Quantitative tools and techniques of accounting, statistics, and mathematics are employed to provide a framework for analysis and decision making. Prerequisite: Approval of instructor.

**612. Advanced Taxes. (2-0). Credit 2. II**

A study of special income tax problems of taxpayers; Federal estate and gift taxes; Texas inheritance tax; Texas franchise tax on corporations; claims for refund of taxes; preparation of protests to deficiency assessments; planning for tax savings. Prerequisite: Business Administration 403. (Offered in 1961-62 and in alternate years thereafter.)

**616. Governmental and Institutional Accounting. (3-0). Credit 3. I, S**

A study of the accounting principles and procedures peculiar to governmental units and institutions. Prerequisite: Business Administration 328. Economics 412 is recommended.

**619. Legal Principles Relating to Accounting. (3-0). Credit 3. I, S**

An intensive study of legal principles emphasizing those which arise in the practice of accounting.

**620. Law and Business. (3-0). Credit 3. I**

Students write a paper on a topic of law in which they are interested, approved by instructor. Also, the following topics are covered: law and business, their relation to each other; present sources of law in Texas today; community property laws of Texas; collection of judgments in Texas; ad valorem taxes; automobile accidents and other topics relating to business. (Offered in 1960-61 and in alternate years thereafter.)

**622. Trade Regulations. (3-0). Credit 3. II, S**

Delineation of governmental control intended to promote free competition and curb its abuses. A study of the Federal anti-trust acts and their application by the courts; the Federal Trade Commission and its method of dealing with unauthorized business practices such as unfair competition, misleading advertising, price discrimination, and retail price maintenance. Prerequisite: Business Administration 305.

**630. Problems of Corporation Finance. (3-0). Credit 3. I**

The financial problems of the profit-seeking corporation are discussed from the viewpoint of the corporate financial officer. Consideration is given to such matters as current financing, financial aspects of promotion, refunding operations, dividend policies, and corporate reorganization. The course is designed to exercise the principles of corporation finance. Prerequisite: Business Administration 418. (Offered in 1960-61 and in alternate years thereafter.)

**631. Business Investigation and Analysis. (3-0). Credit 3. II**
The problems arising in the quantitative and qualitative analysis of railroad, public utility, and industrial securities are presented so as to train the advanced student of investments in the use of the tools of security analysis. The text material is supplemented by the consistent use of representative sources of investment information. Prerequisite: Business Administration 418. (Offered in 1961-62 and in alternate years thereafter.)

**634. Statistical Method Applied to Business Problems. (3-0). Credit 3. II**
The use of statistical methods applied to sales control, cost studies, personnel management, forecasting sales and production of an individual concern, and forecasting general business activity. Readings, reports, and problems. Prerequisites: Business Administration 303, 604. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**
A critical examination of the subject matter presented in current periodicals, recent monographs and bulletins. Separate seminars will be conducted as required in fields such as accounting, finance, marketing, personnel administration, and statistics.

**685. Problems. Credit 1 to 3 each semester. I, II, S**
Directed study on selected problems not covered in the thesis research or in other courses. Prerequisites: Graduate classification; approval of instructor.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis.

## Department of Chemical Engineering

Professor J. D. Lindsay,
Professors W. D. Harris, C. D. Holland; Associate Professor W. B. Harris;
Instructors R. R. Davison, W. J. Tomme, N. E. Welch

**204. Elementary Chemical Engineering. (3-0). Credit 3. I, II**
An introduction to the fundamentals of chemical engineering which involves the solution of elementary problems on the application of mass balances, energy balances, equilibrium balances, rate of approach to equilibrium, and economic balances. Prerequisites: Chemistry 102; Mathematics 210 or registration therein.

**304. Unit Operations. (3-0). Credit 3. I, II** †
A study of fluid and heat flow, evaporation and drying. Prerequisite: Chemical Engineering 204.

**314. Unit Operations Laboratory. (0-3). Credit 1. II** †
Laboratory work based on Chemical Engineering 304. Prerequisite: Chemical Engineering 304.

**409. Oil and Gas Technology. (3-0). Credit 3. I** †
Application of the principles of chemical engineering to the treatment and processing of petroleum and its products. Emphasis is on unit operations. Prerequisite: Chemical Engineering 423.

**423. Unit Operations. (3-0). Credit 3. II, S** †
A continuation of Chemical Engineering 304 covering distillation, gas absorption, filtration, size reduction, separation, and mixing. Prerequisite: Chemical Engineering 304.

**426. Plant Design. (2-6). Credit 4. II** †

The solution of problems involved in the design and development of chemical engineering plants. These problems cover such factors as the capacity, selection, and location of equipment, reaction rates, economic balances, specifications, drawings, cost estimates, and plant location. Prerequisite: Chemical Engineering 441.

**428. Industrial Chemical Processes. (3-0). Credit 3. II**

A study of representative chemical manufacturing processes and their relationships. Prerequisite: Chemical Engineering 441.

**429. Oil and Gas Technology Laboratory. (0-3). Credit 1. I** †

Laboratory work to accompany Chemical Engineering 409.

**433. Unit Operations Laboratory. (0-3). Credit 1. I** †

Laboratory work based on Chemical Engineering 423. Prerequisite: Chemical Engineering 314.

**441. Chemical Engineering Unit Processes. (3-0). Credit 3. I**

A study of such unit processes as sulfonation, nitration, hydrogenation, and alkylation, and the equipment required for them. Prerequisites: Chemical Engineering 423; Chemistry 228.

**454. Chemical Engineering Thermodynamics. (3-0). Credit 3. I** †

A study of the applications of thermodynamics to chemical engineering processes and operations. Prerequisites: Chemical Engineering 423; Chemistry 324.

**461. Process Control and Instrumentation. (2-0). Credit 2. I** †

A study of the fundamental principles and methods used in the measurement and control of the process variables such as pressure, temperature, and flow rate. Prerequisite: Chemical Engineering 423.

**464. Chemical Engineering Kinetics. (3-0). Credit 3. II** †

An introduction to the kinetics of reactions and the application of fundamental principles to the design and operation of commercial reactors. Prerequisites: Chemical Engineering 441, 454.

**481. Seminar. (1-0). Credit 1. I**

Oral discussion of selected topics from recent technical publications. Prerequisite: Senior classification.

**485. Advanced Problems in Chemical Engineering. Credit 1 to 5. I, II**

Special problems in chemical engineering are assigned to individual students or groups. The work may cover the numerous particular problems in chemical engineering processes or operations. It may be laboratory work or conference and discussion. Prerequisites: Chemical Engineering 423; approval of the Head of the Department.

## FOR GRADUATES

**605. Chemical Engineering Economics. (3-0). Credit 3. I**

Advanced calculations involving process design and process control as limited by least cost or maximum profit. Problems are based on the various unit operations and unit processes. Prerequisite: Chemical Engineering 423.

**606. Unit Operations. (3-0). Credit 3. II**

Applications of chemical engineering fundamentals in the manufacture of chemicals, refining petroleum, and other allied industries. Prerequisite: Chemical Engineering 423.

**607. Thermal Cracking. (3-0). Credit 3. I**

Application of fundamentals of chemical engineering to process calculation on thermal cracking. This includes process control and process design. Prerequisite: Chemical Engineering 606.

**608. Heat Transmission. (3-0). Credit 3. I**

Process and process design calculations on equipment involving the transfer of heat by conduction, convection, and radiation. Prerequisite: Chemical Engineering 423.

**611. Furnace Design. (3-0). Credit 3. II**

Process designs of furnaces. Involves radiant and convection heat transmission. Prerequisite: Chemical Engineering 608.

**612. Distillation. (3-0). Credit 3. I**

Process and process design calculations involving distillation of multicomponent and complex systems. Extractive and azeotropic distillation are covered. Prerequisite: Chemical Engineering 423.

**616. Estimation of Investment Cost. (2-0). Credit 2. II**

Simplified methods of estimating cost of process equipment in the preparation of preliminary appraisals. Prerequisite: Chemical Engineering 423.

**617. Unit Processes in Petroleum Refining. (4-0). Credit 4. I**

Calculations involving the effect of process variables on product yield and quality, rate of reaction, operating cost, and investment cost. Processes such as alkylation, isomerization, catalytic cracking, polymerization, thermal cracking, etc. will be covered. Prerequisites: Chemical Engineering 454, 616.

**618. Appraisal and Presentation of Chemical Engineering Data. (3-0). Credit 3. II**

Emphasis will be placed on analysis of experimental data. Practice is obtained by writing reports based on specific problems. Prerequisite: Chemical Engineering 423.

**619. Corrosion and Materials of Construction. (3-0). Credit 3. I**

The uses of materials of construction to preclude high corrosion rates in process equipment. Prerequisite: Chemical Engineering 423.

**623. Applications of Thermodynamics to Chemical Engineering. (3-0). Credit 3. II**

A study of the applications of thermodynamics to chemical engineering operations and processes. Prerequisite: Chemical Engineering 454.

**624. Chemical Engineering Kinetics I. (3-0). Credit 3. I**

A study of rates and mechanisms of chemical reactions. Thermal and catalytic reactions both homogeneous and heterogeneous are considered. Prerequisite: Chemical Engineering 423.

**625. Chemical Engineering Kinetics II. (3-0). Credit 3. II**

A study of the physical factors affecting chemical reaction rates and of methods for design of reaction equipment. Prerequisite: Chemical Engineering 624.

**626. Oil and Fat Technology. (3-0). Credit 3. I**

A study of the composition and properties of oils and fats, methods of extraction and purification, and their industrial utilization. Prerequisites: Chemical Engineering 423; Chemistry 228.

**627. Oil Mill Operation. (2-6). Credit 4. I**

A study of the theoretical and practical operating characteristics of the various units used in vegetable oil production. The economic factors of each unit and their over-all effect on plant operation will be covered. Prerequisite: Chemical Engineering 626 or registration therein.

**661. Nuclear Chemical Engineering. (3-0). Credit 3. I**

This course has to do with the applications of chemical engineering to reactors and the utilization and disposal of residual products therefrom. It will cover such problems as materials of construction, corrosion, industrial utilization of reactors, the influence of radiation on materials, and the utilization of radiation from reactor residues to influence chemical reactions. Prerequisites: Mathematics 308; Physics 312.

**662. Nuclear Material Processing. (3-0). Credit 3. II**

This course has to do with the special applications of unit operations and unit processes to the handling of nuclear fuels and residual products from nuclear reactors. It will cover such topics as distillation, gaseous diffusion separation, liquid-liquid extraction, liquid-solid extraction, gas-solid extraction, ion-exchange, adsorption separations, benefication and metallurgical processing. Prerequisites: Chemical Engineering 423; Mathematics 308.

**681. Seminar. (1-0). No credit. I, II**

Graduate students will be required to attend one hour per week to discuss problems of current importance in connection with their research.

**685. Problems. Credit 1 to 6. I, II, S**

Special work to suit individual or small group requirements. The work may cover the numerous particular problems in chemical engineering processes and operations. It may be laboratory work or conference and discussion. Prerequisite: Approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Problems of unit operations and unit processes. For maximum credit comprehensive thesis must be prepared which is of sufficiently high calibre to permit a publication in the scientific and technical journals. Prerequisite: Approval of Head of Department.

## Department of Chemistry

Professor P. K. Calaway,
Professors J. K. Gladden, C. R. Hancock, E. B. Middleton, R. D. Whealy;
Associate Professors R. B. Alexander*, J. B. Beckham, A. F. Isbell,
A. W. Jache, J. O. Page, Henry Rakoff, A. F. Schram, R. E. Snuggs,
H. K. Zimmerman, Jr., R. A. Zingaro; Assistant Professors R. M.
Hedges, D. R. Lee, E. A. Meyers, N. C. Rose; Instructors P. D. Cratin, W. W. Spurlock

**101. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental laws and theories of chemical activity. Practical applications of the more important chemical processes involving non-metals are briefly described.

General laboratory work deals with non-metals and simple tests of technical importance supplementing lecture demonstrations.

**102. General Chemistry. (3-3). Credit 4. I, II, S**

Fundamental theories of structure and activity. Practical application of the more important chemical processes involving metals described. Organic chemistry is briefly outlined.

Laboratory work consists of elementary qualitative separation and identification of metallic and non-metallic ions. Prerequisite: Chemistry 101.

**106. General Chemistry. (3-3). Credit 4. II**

A survey course in chemistry for students needing it as a cultural subject and not as a basis for advanced work.

**207. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

A considerable portion of the classroom time is devoted to chemical calculation involved in the practice.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. Prerequisite: Chemistry 102.

**223. Elementary Quantitative Analysis. (2-3). Credit 3. I, II, S**

Stress is placed on the basic principles and theories of quantitative analysis, both gravimetric and volumetric. The treatment is not highly mathematical. The laboratory work is designed to illustrate basic techniques. Not open to engineering students. Prerequisite: Chemistry 102.

**225. Elementary Organic Chemistry. (2-0). Credit 2. I**

A study of the hydrocarbons and their relation to the field of petroleum. Prerequisite: Chemistry 102.

**226. Chemical Calculations. (2-0). Credit 2. I**

An advanced review of the chemical calculations of general chemistry with special emphasis on stoichiometry and chemical equilibrium. Prerequisite: Chemistry 102.

**227. Organic Chemistry. (3-3). Credit 4. I, II, S** †

An introduction to the chemistry of the compounds of carbon. A study of general principles and their application to various industrial processes.

The laboratory work serves as a basis of the course; the student here familiarizes himself with the reactions, properties, and relations of typical organic compounds. Prerequisite: Chemistry 102.

**228. Organic Chemistry. (3-3). Credit 4. I, II, S** †

A continuation of Chemistry 227. Prerequisite: Chemistry 227.

**231. Elementary Organic Chemistry. (3-0). Credit 3. I, II, S**

A study of the aliphatic series of organic compounds including an introduction to the benzene series and to vitamins, proteins, and related substances. Applications are taken from the field of agriculture. Not open to engineering students. Prerequisite: Chemistry 102.

**316. Quantitative Analysis. (2-6). Credit 4. I, II, S**

An introduction to the methods of exact analysis as preliminary training for the more advanced courses. In the classroom the practice and theory of the laboratory exercises are dealt with by lectures and recitations. Special attention is given to stoichiometry.

The laboratory work consists of a number of carefully selected experiments in quantitative analysis designed to typify operations of general application. The work is first volumetric, then gravimetric. In the early periods samples of known composition and purity are analyzed. Prerequisite: Chemistry 102.

**317. Quantitative Analysis. (2-6). Credit 4. II**

An introduction to the theory and practice of gravimetric, optical, and electrical methods of analysis. Prerequisite: Chemistry 316.

**323. Physical Chemistry. (3-3). Credit 4. I** †

Explanation and mathematical development of the theories and principles of chemistry. Topics discussed are atomic structure, gas laws, thermodynamics, thermochemistry, liquids, solutions, osmotic pressure, and colloids. Experiments in the laboratory substantiate the theories and principles developed in the classroom. Prerequisites: Chemistry 207 or 316; Mathematics 210.

**324. Physical Chemistry. (3-3). Credit 4. II** †

Intensive study of homogeneous and heterogeneous equilibria, the phase rule, chemical kinetics, catalysis, hydrogen-ion concentration, electrolytic and galvanic cells and electrochemistry, photochemistry, and radioactivity. Prerequisite: Chemistry 323.

**342. Physical Chemistry. (3-3). Credit 4. II** †

Explanation of basic chemical theories and principles with reference to their relationship to transformations in living matter. Special emphasis on such topics as atomic structure, diffusion and osmotic pressure, colloids, chemical equilibrium, catalysis, reaction velocity, hydrogen-ion concentration and its importance in biological processes. Prerequisites: Chemistry 207 or 316, and 227.

**344. Physical Chemistry. (3-0). Credit 3. I**

Structure of atoms, molecules, and crystals. Valence. Theories of polarity and ionization. Properties of gases, liquids, solids, and fugacities. Solubilities and properties of solutions. Study of colloids and surface energy. Equilibria. Electromotive force and oxidation potentials. Prerequisites: Chemistry 207; Mathematics 120 or 209; Physics 219.

**380. Chemical Bibliography. (1-0). Credit 1. II**

A study of the chemical library with instruction in the use of chemical journals, reference books, and other sources of information. Prerequisite: Junior classification.

**447. Qualitative Organic Analysis. (2-6). Credit 4. I** †

The identification of the principal classes of organic compounds. Prerequisite: Chemistry 228.

**450. Colloidal Chemistry. (3-3). Credit 4. I** †

A study of the theories and preparation of disperse systems. Prerequisites. Chemistry 228, 324.

**461. Physical Chemistry. (3-0). Credit 3. I**

This course covers those topics in undergraduate physical chemistry which are not covered in Chemistry 323 and 324. The course content includes surface phenomena, colloids, atomic structure, molecular structure and properties. Prerequisite: Chemistry 324.

**462. Inorganic Chemistry. (3-0). Credit 3. I**

The periodic relationship of the elements, their compounds, principles of their bonding and applications. Prerequisite: Chemistry 324.

**463. Inorganic Chemistry. (2-3). Credit 3. II**

A continuation of Chemistry 462. Laboratory work consists of preparation and analysis of inorganic compounds designed to introduce the student to basic preparative techniques. Prerequisite: Chemistry 462 or approval of instructor.

**481. Seminar. (1-0). Credit 1. II**

Oral discussion of selected topics from technical publications.

**485. Problems. Credit 1 to 4. I, II, S**

An introduction to research, library, and laboratory work. Prerequisites: Senior classification; approval of Head of Department.

## FOR GRADUATES

**600. Survey of Chemistry. (2-3). Credit 3. S**

A survey course in chemistry designed for teachers of high school chemistry. Prerequisites: Graduate classification; approval of Heads of Departments of Chemistry and of Education and Psychology.

**607. Organic Techniques and Preparations. (1-6). Credit 3. II**

A study of laboratory operations theory and a description and comparison of equipment used in advanced work. Application of techniques of organic chemistry is made in the laboratory. Prerequisite: Chemistry 646 or registration therein.

**608. Qualitative Organic Analysis. (1-6). Credit 3. I**

Analysis of organic compounds. Prerequisite: Chemistry 228.

**609. Theory of Organic Chemistry. (3-0). Credit 3. II**

The development and application of chemical theories to organic compounds. Prerequisite: Chemistry 646.

**611. Principles of Physical Chemistry. (3-0). Credit 3. I**

A study of the general principles of chemistry from the quantitative standpoint. The course will include a discussion of gases, liquids, and solutions. Prerequisite: Graduate classification.

**620. Principles of Chemical Analysis. (3-0). Credit 3. II**

An advanced survey of the principles of chemical analysis with special emphasis on the newer developments in the field of analytical chemistry. Prerequisite: Chemistry 317.

**621. Chemical Kinetics. (3-0). Credit 3. I**

Study of some of the present theories about chemical reaction rates and mechanisms. Prerequisite: Chemistry 324.

**624. Physico-Organic Chemistry. (3-0). Credit 3. II**

Mathematical and quantitative investigation of organic chemical phenomena. Prerequisite: Chemistry 609 or approval of instructor.

**625. Petroleum Chemistry. (3-0). Credit 3. II**

Practical and theoretical consideration of chemical reactions of petroleum hydrocarbons. Prerequisites: Chemistry 228, 324. (Offered in 1961-62 and in alternate years thereafter.)

**626. Thermodynamics. (3-0). Credit 3. I**

Theory and applications of classical thermodynamic functions. Prerequisite: Chemistry 324.

**628. The Non-Metallic Elements. (3-0). Credit 3. I**

Study of the non-metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**630. The Metallic Elements. (3-0). Credit 3. I**

Study of the metals and their compounds. Recent developments. Knowledge of German or French desirable. Prerequisite: Chemistry 324.

**631. Statistical Thermodynamics. (3-0). Credit 3. II**

An introduction to the methods of statistical mechanics based primarily on Boltzmann statistics. The approach to thermodynamics through the partition function. The statistical concept of entropy. Prerequisite: Chemistry 626.

**635. Heterocyclic Compounds. (3-0). Credit 3. I**

Structure, preparation, and properties of heterocylic compounds with special emphasis on those with biological activity. Prerequisite: Chemistry 228. (Offered in 1960-61 and in alternate years thereafter.)

**636. Electrochemistry. (3-0). Credit 3. II**

Advanced treatment of conductivity, electrochemical thermodynamics, galvanic cells, electrodeposition, and corrosion. Prerequisite: Chemistry 324.

**639. Instrumental Methods of Analysis. (2-3). Credit 3. I**

A study of the theory and practice of modern techniques of chemical analysis and research. The laboratory work will illustrate the use of these instruments for routine analytical work and also their use as research tools. Prerequisite: Chemistry 317.

**641. Structural Inorganic Chemistry. (3-0). Credit 3. I**

Study of nuclear and extranuclear structure, isotopes, valency of the elements, and sterochemistry of inorganic compounds. Prerequisites: Chemistry 324, 462.

**642. Methods of Structural Chemistry. (3-0). Credit 3. II**

A study of theory, methods, and application of structural determination (arrangement and bonding) of chemical species. Prerequisite: Chemistry 641 or approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

**643. Inorganic Complex Compounds. (3-0). Credit 3. II**

History, theories, and methods of investigations of inorganic complex compounds. Prerequisites: Chemistry 324, 462. (Offered in 1960-61 and in alternate years thereafter.)

**644. Quantitative Organic Analysis. (1-6). Credit 3. I**

Determinations: Macro Dumas, sulfur, Carius hologen, Micro residue, fractionation, Micro Dumas, catalytic hydrogenation, carbon and hydrogen, Micro Kjeldahl, Rast molecular weight, molar refraction, active hydrogen, alkaxyl, semi-micro saponification number. Prerequisites: Chemistry 228; reading knowledge of German.

**646. Organic Chemistry. (3-0). Credit 3. I**

A systematic and thorough presentation of organic chemistry on an advanced level. Prerequisite: Chemistry 228.

**648. Principles of Quantum Mechanics. (3-0). Credit 3. II**

A brief review of classical mechanics and the development of wave mechanics. The application of wave mechanics to some special chemical problems. Prerequisite: Approval of the instructor.

**661. Radiochemistry. (3-0). Credit 3. I**

A general course dealing with radioactive materials; their radiations; their preparation, purification, detection, identification, and their practical applications. Material on nuclear structures, nuclear transmutations, and radioactivity. Prerequisite: Chemistry 324 or 344.

**685. Problems. Credit 1 to 6. I, II, S**

This is a course in special topics to suit small group requirements. The work will deal with the more recent problems and results in the various branches of chemistry. It may be laboratory work or conference and discussion. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Civil Engineering

Professor S. R. Wright,
Professors J. B. Baty, F. J. Benson, S. J. Buchanan, B. M. Gallaway, E. L. Harrington, R. M. Holcomb, T. R. Jones, Jr., C. J. Keese, J. A. Orr, J. H. Sorrels, H. K. Stephenson, R. N. Traxler; Associate Professors R. E. Schiller, Jr., F. M. Smith; Assistant Professors W. A. Dunlap, T. J. Hirsch, R. A. Jimenez, W. R. McCasland*, Charles Pinnell, N. J. Rowan, E. P. Segner, Jr.; Instructors H. E. Fairbanks, B. D. Franklin, W. M. Moore, R. M. Olson, R. P. Shubinski*

**201. Plane Surveying. (3-3). Credit 4. I, II**

Measurement of distances; use and care of surveying equipment; measurement of angles; land surveys and computations; stadia and plane table surveys; route surveys; horizontal and vertical curves; earthwork computations. Prerequisite: Mathematics 103.

**202. Advanced Surveying. (2-3). Credit 3. I, II**

Outlining reconnaissance, preliminary, and location of route surveys; computing and staking out simple and compound curves; cross-sectioning, earth work computations, mass curves; drainage areas, size of drainage structures; topographic mapping; profiles plans, and calculations of quantities for engineering projects. Prerequisite: Civil Engineering 201.

**206. Plane Surveying. (0-3). Credit 1. I, II**

Fundamental principles of surveying; use of transit and level; boundary surveys, area computations, profile surveys. Prerequisite: Mathematics 103.

**208. Topographic Surveying. (1-3). Credit 2. I, II**

Fundamental principles of surveying; use of transit and level; special emphasis placed on use of plane table in topographic mapping. Prerequisite: Mathematics 103.

**300. Summer Surveying Practice. Credit 5. S**

Six weeks of surveying practice. Horizontal and vertical control; base line measurements; transit-stadia surveys; plane table surveys; boundary surveys; area and coordinate computation; polaris and solar observations; route surveys. Stream gauging. Prerequisite: Civil Engineering 201.

**305. Mechanics of Materials. (3-0). Credit 3. I, II, S**

Stresses; deformations; stress-strain properties; mechanics of thin-walled cylinders, beams, shafts, columns, riveted and welded joints; elastic deflections in beams; combined loadings; combined stresses. Prerequisites: Mathematics 210; Mechanical Engineering 212 or the equivalent.

**306. Mechanics of Materials. (2-0). Credit 2. I, II, S**

Principal stress relationships including graphical as well as analytical solutions; energy loads in beams; applications of moment area method; multiple integration method including graphical properties of integral curves; moment distribution method of analyzing statically indeterminate structures. Prerequisite: Civil Engineering 305.

**311. Hydraulics. (3-0). Credit 3. I, II**

The laws governing the action of water at rest and in motion, as related to engineering problems; the flow of water in pressure mains, sewers, aqueducts, open channels, and in rivers; measurement of the flow of water by nozzle, orifices, weirs and meters; flow of viscous fluids. Prerequisite: Mechanical Engineering 212 or equivalent.

**315. Strength of Materials Laboratory. (0-2). Credit 1. I, II**

Determination of the strength, ductility, modulus of elasticity, and other properties of engineering materials. Tests of timber, steel, cast iron, concrete, and reports showing results. Prerequisite: Civil Engineering 305 or registration therein.

**336. Hydraulics Laboratory. (0-2). Credit 1. I, II**

Calibration of nozzles, orifices, water meters, weirs, pressure gauges; measurement of pipe friction; measurement of pipe flow with pitot instrument and Venturi meter; efficiency tests on impulse motor, hydraulic ram, and centrifugal pump; solution of assigned problems. Prerequisite: Civil Engineering 311 or registration therein.

**338. Hydraulics of Drainage Structures. (2-0). Credit 2. I, II**

The elementary study of rainfall and run-off and the hydraulics of culverts and drainage structures; flow in open channels. Prerequisite: Civil Engineering 311.

**344. Plain and Reinforced Concrete. (3-3). Credit 4. I, II, S**

Properties of concrete; plain concrete structures; theory of stress distribution in reinforced concrete in bending, shear, bond, and anchorage; design of typical beams, slabs, and walls; stress distribution in spiral and tied columns with axial and eccentric loading; design of typical columns; interpretation of typical current specifications and use of available tables and charts; economic factors. Prerequisites: Civil Engineering 306, 345.

**345. Theory of Structures. (2-3). Credit 3. I, II, S**

An introduction to structural engineering; loads, reactions, and structural force systems; algebraic and graphical computations of reactions, and forces in beams, three-hinged arches, and trussed structures used as roofs, floor systems, and bridges; influence lines and criteria for moving loads; analysis of indeterminate structures by the general deflection procedure; reactions and forces in bents. Prerequisite: Civil Engineering 306 or registration therein.

**346. Design of Members and Connections. (2-3). Credit 3. I, II, S**

The design of tension members, compression members, beams, riveted joints, and welded joints. Theory and practice as indicated in typical current specifications. Prerequisites: Civil Engineering 306, 345.

**401. Water and Sewage Treatment. (2-2). Credit 3. I, II, S** †

Principles and methods of water purification and sewage treatment and disposal; laboratory demonstrations of control tests and correlation of results with treatment plant operation; interpretation of reports; inspections of local plants. Prerequisites: Chemistry 102; Civil Engineering 311.

**402. Water Supply and Sewerage Practice. (2-2). Credit 3. I, II** †

Development of sources of water supply; determination of the quantity of storm water and domestic sewage; short problems relating to water supply distribution systems, sewer systems, and the general features of water purification and sewage treatment plants; appurtenances and treatment plant equipment; local inspections of water supply and sewerage systems. Prerequisites: Civil Engineering 338, 401.

**403. Sanitary Design. (2-3). Credit 3. II** †

Practical problems in the design of sewer systems and appurtenances; sewage treatment plants; water collection and distribution systems; water purification plants. Prerequisite: Civil Engineering 402 or registration therein.

**406. Sanitation and Public Health. (3-0). Credit 3. I** †

Relation of sanitation to public health; residential water supply and excreta disposal methods; municipal sanitary work, including refuse disposal; plumbing; control of food supplies; mosquito, fly, and rodent control; sanitation of swimming pools; industrial hygiene; organization of health departments. Prerequisite: Junior classification.

**407. Highway Engineering. (3-0). Credit 3. I, II, S** †

An introduction to problems in location, design, drainage, construction, and maintenance of highways, streets, and pavements. Road laws, finances, highway organizations and supervision briefly considered. The text is supplemented by lectures, the use of bulletins, models, and samples of materials. Prerequisites: Civil Engineering 300, 338, 465 or registration therein.

**408. Municipal Administration. (3-0). Credit 3. I** †

City government, including the city manager plan; relation of city to state; administration of city departments; public utilities; city planning. Prerequisite: Junior classification.

**417. Bituminous Materials. (2-3). Credit 3. II** †

Origin, production, specifications, and tests of bituminous materials and mixtures used in the construction and maintenance of roads and pavements. Prerequisites: Senior classification in engineering and Civil Engineering 407 or registration therein.

**435. Soil Engineering. (2-3). Credit 3. I**

Problems encountered in the design and construction of earth dams and coffer dams; design of footings, drilled piers, and pile substructures; design and construction of embankments and subgrades for roads and airfields; seepage through earth masses. Prerequisites: Civil Engineering 465; senior classification.

**443. Materials of Construction. (1-3). Credit 2. I, II** †

Laboratory tests, supplemented with theory, of aggregates, cement, concrete mixtures, and masonry materials. Prerequisite: Senior classification.

**448. Engineering Economy. (2-0). Credit 2. I, II** †

Analysis of operating costs of engineering projects including interest, depreciation, fixed costs, overhead. Comparison of first cost economy versus ultimate economy. Prerequisite: Junior classification in engineering.

**456. Highway Design. (2-3). Credit 3. II**

Theory and practice in highway design. Highway classification and design criteria, location studies, design of vertical and horizontal alignment, cross section, pavement, intersections and highway drainage elements. Prerequisite: Civil Engineering 407.

**457. Traffic Engineering. (3-0). Credit 3. I, S** †

A study of vehicle operating characteristics, traffic flow, geometric design of roads, streets, and intersections, and methods of traffic control. Prerequisites: Civil Engineering 201, 407 or registration therein; Physics 219.

**458. Hydraulic Engineering. (3-0). Credit 3. II** †

Flow in pipes and complex pipe systems; non-uniform flow in open channels; pumping machinery; elementary hydraulic model theory. Prerequisite: Civil Engineering 338.

**463. Hydrology. (3-0). Credit 3. I** †

A study of the occurrences and measurements of precipitation and stream flow, relations between precipitation and run-off; estimating seepage; evaporation, run-off; surface, and flood discharges for drainage basins. Prerequisite. Civil Engineering 311.

**465. Soil Mechanics and Foundations. (2-2). Credit 3. I, II, S** †

An elementary introduction to soil mechanics and its application to the usual problems encountered in civil and architectural engineering. The origin, formation processes, and types of soils are reviewed. Methods of exploration and soil testing required for the design of various types of foundations, retaining walls, bridge abutments, coffer dams, earth dams, and other engineering structures. Prerequisites: Civil Engineering 305; Geology 320 or 422.

**468. Statically Indeterminate Structures. (2-3). Credit 3. I** †

Definitions, functions, and identification of statically indeterminate structures; their uses, advantages, and disadvantages; general method of design; general method of analysis based on deflections; deflection computations for beams by elastic-curved-beam theory, moment areas, and conjugate beam; deflections of trusses by virtual work and williot diagrams; preliminary designs; formulation and solution of simultaneous equations; superposition, final stresses; moment distribution; applications in the design of arches, rigid frames, and continuous beams. Prerequisite: Civil Engineering 345.

**470. Aerial Photogrammetry. (2-3). Credit 3. II** †

A study of photogrammetric optics, characteristics of aerial photographs, aerial cameras, map projections, ground control, radial plots, mosaics, interpretation of aerial photographs, stereoscopic plotting instruments, and mapping from oblique photographs. Prerequisite: Civil Engineering 201.

**473. Cost Estimating. (3-0). Credit 3. I, II, S** †

Approximate and detailed estimates of the cost of construction projects including earthwork, foundations, concrete, masonry, steel, and miscellaneous items. Costs are developed to include materials, equipment, labor, overhead, and profit. Prerequisite: Senior classification.

**478. Construction Plant and Methods. (3-0). Credit 3. I, II** †

Plant and equipment selection for earthwork, foundations, concrete and structural steel, based on performance and economy. Construction schedules, progress reports, and performance records. Prerequisite: Senior classification in engineering or architecture.

**481. Seminar. (1-0). Credit 1. I, II** †

A study of the methods of job procurement subsequent to graduation including letters of application and job interviews; responsibilities and obligations of the young civil engineer; professional ethics; membership in professional societies, professional registration; lectures by staff and practicing engineers. Prerequisite: Senior classification.

**483. Analysis and Design of Structures. (2-3). Credit 3. I, II** †

The over-all procedure of analysis and design, including functions, loads, layouts of force systems, analysis, design drafting, specifications, cost comparisons, and maintenance as applied to typical simple bridge and building structures, design of plate girders, trusses, and reinforced concrete buildings. Prerequisites: Civil Engineering 344, 346, 465.

**486. Design of Prestressed Concrete Structures. (2-3). Credit 3. II** †

Basic theory. Properties of materials used. Stress losses. Prestressing systems. Design of determinate beams for flexure, shear, bond, and bearing. Deflections. Design of slabs and of continuous beams. Circular prestressing. Tension and compression members. Connections. Current specifications and economics of design. Prerequisite: Civil Engineering 483.

## FOR GRADUATES

**601, 602. City Management. (4-0). Credit 4 each semester. I, II**

Development of European and American cities; forms of city government; functions of the city manager; administration of municipal affairs; organization of city departments; city finances, public utilities, fire prevention and protection, police administration; parks and playgrounds; public health and welfare; housing; city planning.

**603. Sewage Treatment and Stream Sanitation. (4-0). Credit 4. I**

Advanced studies of the theories of the various processes of sewage treatment, with special attention given to the details of the individual methods and units employed to effect these processes; and the requirements regarding the quality of sewage treatment plant effluents in relation to the sanitary protection of the receiving waters. Prerequisite: Civil Engineering 402.

**604. Water Quality and Treatment. (4-0). Credit 4. II**

Advanced studies of the characteristics of available sources of water, standards of quality of public water supplies, and the theories of treatment and purification processes, with special attention given to the details of the methods and units employed to effect these processes. Prerequisite: Civil Engineering 402.

**607, 608. Environmental Sanitation. (4-0). Credit 4 each semester. I, II**

Detailed study of environment and its relation to disease, covering malaria and its control; rodent control; sanitation of milk, shellfish, and other foods; collection and disposal of municipal refuse; sanitary aspects of air conditioning; housing sanitation, including plumbing and ratproofing; rural water supply and excreta disposal; sanitary inspection procedure.

**610. Industrial Wastes. (4-0). Credit 4. II**

Amount and characteristics of the common industrial wastes; their effects upon sewage treatment; methods of treatment. Prerequisite: Civil Engineering 401 or the equivalent.

**612. Transportation in City Planning. (2-0). Credit 2. I, S**

The importance and place of transportation in ubran development and planning. The role of the engineer in planning. The relationship of transportation to planning studies, land use, zoning, planning legislation, and administration. Prerequisite: Graduate classification in the School of Engineering.

**615. Structural Design of Flexible Pavements. (2-0). Credit 2. I**

Characteristics of pavement loads, stress analysis in flexible pavements, design practices, construction and maintenance. Prerequisite: Civil Engineering 407.

**617. Traffic Engineering: Characteristics. (2-3). Credit 3. I**

Advanced theory and practice of engineering studies of traffic characteristics. Methods of traffic administration. Prerequisite: Civil Engineering 457.

**618. Traffic Engineering: Operations. (2-3). Credit 3. II**

Advanced theory and application of traffic control and design of traffic facilities. Traffic regulations. Prerequisites: Civil Engineering 457, 617.

**619. Highway Problems Analysis. (2-3). Credit 3. II**

The theory and application of advanced techniques in statistics, aerial photogrammetry, and data processing in the solution of problems in highway and traffic design and research. Students should have knowledge of computer programming and basic statistics. Prerequisite: Approval of the Head of the Department.

**620. Structural Design of Rigid Pavements. (2-0). Credit 2. II**

Theory of rigid pavement design, design practices, maintenance, and construction. Prerequisite: Civil Engineering 407.

**621. Advanced Reinforced Concrete Design. (3-3). Credit 4. II**

Creep, shrinkage, and temperature change effects in concrete. Deflections in reinforced concrete members. Combined bending and axial loads. Deep beams. Torsion in concrete members. Ultimate strength design methods. Retaining walls, rectangular tanks, circular tanks, and deep bins. Flat slab floor systems and bridges. Domes. Prerequisite: Civil Engineering 483.

**622. Hydraulics of Drainage Structures. (2-3). Credit 3. II**

Hydraulics of open channels, bridge openings, culverts, head walls, surface street drainage, storm sewers, gutters, drop inlets and spillways. Theory of model studies as applied to drainage of highways, streets, and freeways. Prerequisite: Civil Engineering 338 or the equivalent.

**625. Geometric Design of Highways. (3-3). Credit 4. I**

The advanced theory and practice in highway design. Design controls and criteria, elements of design, design of alignment, cross-section, intersections and interchanges, multilane expressways, and drainage structures. Prerequisites: Civil Engineering 407, 465.

**627, 628. Hydraulic Engineering. (3-3). Credit 4 each semester. I, II**

Advanced hydrology, water power development, flood control, irrigation.

**629. Hydraulics of Open Channels. (3-3). Credit 4. I**

Advanced problems in uniform and non-uniform flow in open channels; the hydraulic jump; control section; backwater profiles.

**630. Ground Water Hydrology. (1-3). Credit 2. II**

A quantitative study of the application of the principles of hydrology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent, registration in 625.

**631. Advanced Structural Analysis. (3-3). Credit 4. I**

Review and correlation of the various procedures for analyzing indeterminate structures. The general method based on deformation limitations. Various methods of solving simultaneous equations. The neutral point and column analogy methods for fixed arches and frames. Moment distribution in complex structures. Plastic analysis. Prerequisites: Civil Engineering 468, 483.

**632. Advanced Design in Metals. (2-3). Credit 3. II**

Properties of high-strength and other special materials. Stress concentrations and fatigue. Ultimate strength. Reconsideration of selected specification rules in the light of theory, tests and new developments. Characteristics of thin gauge structures. Design of complex members and connections such as: curved columns, fixed bases, and rigid-frame knees. Prerequisites: Civil Engineering 468, 483.

**633. Advanced Mechanics of Materials. (4-0). Credit 4. I**

Principal stresses and theories of failure of elastic action; stress concentrations; unsymmetrical bending; mechanical methods for study of internal stresses; thick-walled cylinders; torsion in non-circular cross sections; special problems such as bending in flat plates, buckling of webs, and bending in curved beams and hooks. Prerequisite: Civil Engineering 306.

**634. Airfield Planning and Design. (2-0). Credit 2. II**

Study of regional planning, air traffic routing, landing requirements, methods for development of master plans for site selection, airfield design requirements involving layouts, pavement selection, and design. Review and application of criteria of design of drainage for all types of fields.

**636. City Street Design. (2-0). Credit 2. S**

Street classification and function. Design of city streets, intersections, access drives, and pavements. Street drainage. Financing city street improvements. Prerequisite: Civil Engineering 407.

**640. Freeway Design and Operation. (2-0). Credit 2. S**

Characteristics of traffic flow on controlled access facilities. Advanced theory and practice in operation on freeways and related street systems. Freeway traffic control. Material based on advanced research of the Texas Transportation Institute. Prerequisite: Civil Engineering 618.

**647. Analysis of Three-Dimensional Structures. (3-3). Credit 4. I**

Stability and statics in three dimensions. Analysis of three-dimensional trusses by method of joints, methods of sections, Henneberg's method, and graphically. Applications to derricks, cranes, towers, and domes. Beams curved in space. Introduction to three-dimensional rigid frames, thin shells, and folded plates. Prerequisite: Civil Engineering 468.

**648. Design of Thin-Shell Structures. (2-3). Credit 3. II**

General theory. Membrane theory for shells without bending. Edge effects. Effects of unsymmetrical loading. Supporting structures. Applications in the design of shells of spherical, cylindrical, other surfaces-of-revolution, hyperbolic-parabaloid, and other shapes. Aesthetic, construction, and economic factors. Prerequisite: Civil Engineering 647.

**649. Soil Mechanics. (3-3). Credit 4. I**

A study of foundation materials as they exist and of the various types of soils, their physical properties, testing procedure, and principles of classification. For advanced undergraduates and for graduate electives. Prerequisites: Civil Engineering 465; Geology 320.

**650. Soil Mechanics. (3-3). Credit 4. II**

A study of theory and practice in foundation explorations, laboratory investigations of undisturbed foundation samples, stress distribution through soils; problems in foundation design, correlation of settlement data from actual observations on the behavior of existing structures, stability of embankments, backfill pressures. Prerequisite: Civil Engineering 649.

**651. Advanced Theory and Application of Soil Mechanics. (3-3). Credit 4. I**

Special lectures, discussions and applications of theory to solution of major problems encountered in practice of soil engineering, embracing the fields of seepage, earth work design, foundation design, port structures, and special problems. Prerequisite: Civil Engineering 650.

**653. Flexible Materials of Construction. (2-3). Credit 3. I**

Theory supplemented with laboratory tests of bitumen, tars, and plastics. Stabilization of base and subgrade materials. Advanced mix design and evaluation of test methods; rheology and chemistry of asphalt. Prerequisite: Civil Engineering 417.

**654. Rigid Materials of Construction. (2-3). Credit 3. II**

A study of physical and chemical properties of rigid materials of construction; laboratory tests of different kinds of concrete, tests of metals and laminates; theory of corrosion of ferrous metal; corrosion mitigation; shrinkage and plastic flow of stressed concrete; design of concrete mixtures for resistance to alkali reactive aggregates, blasts from jet planes, salt water, and cavitation in hydraulic works. Prerequisite: Civil Engineering 443.

**655. Prestressed Concrete Testing Laboratory. (1-3). Credit 2. I**

Demonstrations of the various types of tendons, anchoring devices, and prestressing equipment. Methods and equipment used in testing. Design, construction, and testing of prestressed beams, slabs, columns, and connections. Correlations with theory. Prerequisite: Civil Engineering 486.

**656. Concrete Structures Testing Laboratory. (1-3). Credit 2. II**

Methods and equipment used in testing reinforced concrete structures and elements of structures. Planning of tests, and testing of various beams and columns. Observations of behavior in compression, flexure, shear, torsion, and combinations thereof. Correlations with theory, both elastic and plastic. Prerequisite: Civil Engineering 621.

**657. Dynamic Loads and Structural Behavior. (3-3). Credit 4. I**

The forces resulting from wind, other moving fluids, earthquakes, blasts, impact, moving loads, and machinery. The dynamic behavior of various structures and structural elements under the action of such loads. Self-induced vibration. Design to minimize and resist such forces. Prerequisites: Civil Engineering 468, 483; Mechanical Engineering 459.

**658. Dynamic Structures Testing Laboratory. (1-3). Credit 2. II**

Observations of modes of vibration of structures and structural elements. Use of wind tunnel to determine wind forces. Stresses produced by moving loads on bridges. Correlations with theory. Prerequisite: Civil Engineering 657.

**660. Design of Folded-Plate Structures. (1-3). Credit 2. II**

Characteristics and uses; aesthetic, construction, and economic factors. Design procedure for long, shallow structures. Approximate procedure for short, deep structures. End diaphragms. Effects of intermediate diaphragms. Triangular plates. Combined stresses. Buckling of thin elements. Prerequisite: Civil Engineering 631.

**661. Structures Testing Laboratory Techniques. (1-3). Credit 2. I**

Methods and equipment for testing and for observing strains and deflections. Practice in the use of machines and equipment. Design of experiments, preparation of specimens, and observation of physical behavior. Correlations with theory. Prerequisite: Civil Engineering 483.

**662. Metal Structures Testing Laboratory. (1-3). Credit 2. II**

Planning tests, tests and observations of more complex metal structures and elements. Unsymmetrical bending, web buckling in beams and columns, lateral buckling of beams. Stress distribution at bends, corners, and abrupt changes. Plates and shells. Correlations with theory. Pererequisites: Civil Engineering 633, 661.

**663. Theory of Elastic Stability. (4-0). Credit 4. I**

Primary buckling of centrally or eccentrically loaded columns; primary buckling of centrally loaded columns by torsion; built-up columns; lateral buckling of beams; stability of web plates of girders; local buckling of plate elements of columns. Prerequisite: Civil Engineering 633 or the equivalent.

**666. Foundation Structures. (3-3). Credit 4. II**

The structural analysis and design of foundations. Spread footings, combined footings, and raft foundations. Retaining walls, piles, and pile foundations. Sheet-pile structures, cofferdams, wharves, and piers. Bridge piers and abutments. Prerequisites: Civil Engineering 483, 649.

**667. Highway Structures. (3-3). Credit 4. I**

The structural analysis and design of bridges, grade separation structures, retaining walls, and culverts. Review of functional and aesthetic requirements. Loads, materials, comparisons of different types, and economic proportions. Current standard, new developments, and current cost information. Prerequisites: Civil Engineering 483, 625.

**669. Bituminous Technology. (2-0). Credit 2. I, II**

A review will be made of the methods and techniques used in evaluating the chemical, physical, colloidal and rheological properties of asphaltic materials. The available data will be discussed and a study made of the methods for evaluating durability of asphalt. The original literature will be used for assigned reading. Prerequisite: Civil Enginering 417.

**670. Bituminous Technology. (2-0). Credit 2. I, II**

A study will be made of procedures used in selecting and processing crude oil for the manufacture of asphalt. The fundamental properties of asphaltic cutbacks, asphalt emulsions and mineral filled bitumens will be reviewed. The requirements of asphalts for use in roads, roofing and special applications will be studied. Original source material will be used. Prerequisites: Civil Engineering 417, 669.

**671. Urban Transportation Planning. (2-0). Credit 2. S**

The urban transportation problem. Techniques of estimating demand for traffic facilities. Special studies required in transportation planning. Prerequisites: Civil Engineering 617, 618.

**672. Urban Transportation Planning. (2-0). Credit 2. S**

Problems of mass transportation. Study of the central business district, suburban shopping centers and terminal planning. Street and subdivision transportation system planning. Urban transportation economics, financing, and administration. Prerequisite: Civil Engineeirng 671.

**681. Seminar. (0-2). Credit 1. I, II, S**

Reports and discussion of current research and of selected published technical articles. May not be taken for credit more than once in a Master's degree program and twice in a Ph.D. program. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

A course offered to enable majors in civil engineering to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by other courses in the established curriculum. Credit for this course normally will be limited to four credits per semester, but in exceptional circumstances, the Head of the Department may approve a maximum of six credits in one semester or summer term.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Dairy Science

Professor I. W. Rupel,
Professors R. E. Leighton, A. V. Moore; Associate Professors I. I. Peters,
Carl Vanderzant; Assistant Professor M. A. Brown

**202. Dairying. (2-2). Credit 3. I, II**

A survey of the dairy industry; dairy breeds, standards for selection and culling, herd replacements, feeding, management, and health maintenance. Food value of milk, tests for composition and quality, utilization and processing of market milk and dairy products. Prerequisite: Chemistry 101.

**301. Market Milk. (3-2). Credit 4. I** †

Nutritional value of milk; milk and public health; organization of city milk supplies; processing, distribution, and inspection of market milk. Prerequisites: Biology 206; Dairy Science 202.

**303. Dairy Cattle Judging. (0-3). Credit 1. I**

A study of comparative judging of dairy cattle. Economic value of dairy type. Student contests and commercial judging techniques. Prerequisite: Dairy Science 202.

**307. Judging Dairy Products. (0-3). Credit 1. II**

Practice in judging and scoring dairy products according to consumer preference, established student contest, and commercial standards. Prerequisite: Dairy Science 202 or approval of the instructor.

**310. Advanced Dairy Cattle Judging. (0-2). Credit 1. II**

Advanced dairy cattle judging with particular attention to show ring type and breed registry association classification. Prerequisite: Dairy Science 303.

**311. Technical Control of Dairy Products. (2-6). Credit 4. II** †

Methods of analysis of milk and milk products, and their use in controlling the composition and quality of dairy products. Prerequisites: Chemistry 223, 231; Dairy Science 301.

**316. Butter and Cheese Manufacture. (3-4). Credit 4. II** †

Processing procedures in the commercial manufacture of domestic and foreign cheeses; creamery butter manufacture. Prerequisites: Dairy Science 301, 320. (Offered in 1960-61 and in alternate years thereafter.)

**320. Bacteriology of Dairy Products. (3-3). Credit 4. I** †

Relation of micro-organisms to quality in milk and milk products; starter and fermented milk culture management; sanitary control on farms and in commercial dairies; standard analytical procedures according to the American Public Health Association. Prerequisite: Biology 206.

**324. Commercial Dairy Products. (3-0). Credit 3. II**

A modification of Dairy Science 316, 407, 415. Prerequisite: Dairy Science 202. (Offered in 1961-62 and in alternate years thereafter.)

**326. Food Preservation and Decomposition. (3-3). Credit 4. II** †

The microbiology of human foods and accessory substances. A study of raw and processed foods, emphasizing the physical, chemical, and biological phases of spoilage. Standard industry techniques of inspection and control. Prerequisite: Biology 206.

**407. Ice Cream Manufacturing. (2-3). Credit 3. I** †

The manufacture of ice cream, sherbets, and ices, and the physical and chemical principles involved; ice cream plant equipment; flavoring materials; merchandising. Prerequisite: Agricultural Engineering 213; Dairy Science 202.

**410. Dairy Plant Management. (1-2). Credit 2. II** †

Dairy plant operating efficiency. Special economy problems related to the handling of fluid milk, butter, cheese, and concentrated dairy products. Prerequisite: Senior classification in dairy science.

**415. Condensed and Powdered Milk. (2-2). Credit 3. I** †

The manufacture and distribution of condensed and evaporated milk, milk powder, milk sugar, casein, and other milk products. Prerequisites: Chemistry 231 or equivalent; Dairy Science 301; one semester of physics.

**417. History and Development of Dairy Cattle. (2-2). Credit 3. I** †

The breeding and development of a dairy herd, including artificial breeding, selection of breeding animals, production testing and type classification, breeding programs, herd analysis, and a review of the development of the breeds. Prerequisites: Dairy Science 202; Genetics 301.

**418. Feeding and Management of Dairy Cattle. (3-2). Credit 4. II** †

The feeding, care, and management of the dairy herd; calf raising, developing the dairy heifer, care of dry and fresh cows, feeding for milk production, disease control, silage, buildings, and related topics. Prerequisites: Animal Husbandry 303 or Biochemistry and Nutrition 401; Dairy Science 202.

**420. Dairy Management. (1-2). Credit 2. II**

Feeding, care and management of dairy cattle, including herd improvement through breed selection, feeding for milk production, development of replacement stock and disease control. For agricultural education majors only. Prerequisites: Animal Husbandry 303; Dairy Science 202; Genetics 301.

**481. Seminar. (1-0). Credit 1. I, II** †

A review of current dairy literature and presentation of papers on selected dairy topics. May be elected a second time for one additional credit. Prerequisite: Senior classification.

**485. Special Problems. Credit 1 to 4. I, II** †

Special problems in dairy production or dairy manufactures. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of Head of Department.

### FOR GRADUATES

**601, 602. Dairy Production. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy production, feeding, breeding, and management. Prerequisite: Dairy Science 418.

**603, 604. Dairy Manufactures. (2-6). Credit 4 each semester. I, II**

An advanced study of dairy manufactures. Prerequisites: Dairy Science 316, 407, 415.

**609. Dairy Cattle Breeding and Management. (3-0). Credit 3. S**

Advancements in dairy cattle feeding, breeding, management, and commercial milk production. A three-week course for agricultural workers offered in summer sessions only. Not open to dairy science majors. Prerequisite: Dairy Science 418 or 420 or approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A study of research methods and a review of scientific literature dealing with individually selected problems in production or manufactures and not pertaining to thesis or dissertation. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research leading to thesis or dissertation in the respective fields of dairy production and dairy manufactures. Prerequisite: Graduate classification.

## Department of Economics

Professor A. F. Chalk,
Professor E. E. Liebhafsky; Associate Professors J. E. Hibdon, H. R. Putnam;
Assistant Professors C. A. Bitner, Jr., M. H. Butler, M. G. Daniels, L. H. Stern

**203. Principles of Economics. (3-0). Credit 3. I, II, S**

An introductory survey course designed to acquaint the student with elementary principles of economics; the economic problem, the measurement and determination of national income, money and banking, and the theory of price. Prerequisite: Sophomore classification.

**204. Principles of Economics. (3-0). Credit 3. I, II, S**

A second course in elementary economics with primary emphasis upon analysis of economic aggregates, the theory of production and of the firm, international economic relations and labor problems. Prerequisite: Economics 203.

**311. Money and Banking. (3-0). Credit 3. I, II, S**

The fundamental principles of money, credit, and banking and their exemplification in modern currency and banking history, particularly that of the United States. Special attention is given to present-day conditions and problems. Prerequisite: Economics 203.

**318. Economics of Labor. (3-0). Credit 3. I, II, S**

Special attention is given to the labor force, unemployment, labor markets, wages, work periods, the aged worker, industrial accidents, and phases of social security. Prerequisites: Economics 203, 204.

**319. Economic Development of the United States. (3-0). Credit 3. II**

A survey of the economic development of the United States from colonial times to the present. The course will describe the origin and development of our economic and social institutions and provide a basis for an understanding of our present economic problems. Prerequisite: Economics 203.

**320. Economic Development of Europe. (3-0). Credit 3. II**
A survey of the steps by which economic activities have evolved from the Medieval period into the complex capitalistic economy of today. Special emphasis on the development of the wage system, the Industrial Revolution, the expansion of markets, the ebb and flow of industrial activities, the financial structure, and the relation of industrial development to political policy. Prerequisite: Economics 203.

**321. International Trade and Finance. (3-0). Credit 3. I** †
A study of international economics, including the theory of international trade, foreign exchange, and the balance of payments; tariffs, exchange controls, and other barriers to trade; international investment; and contemporary problems of international disequilibrium. Prerequisite: Economics 203.

**323. Economic Analysis. (3-0). Credit 3. I** †
The importance of prices in directing production and distributing income under both competitive and monopolistic market situations is considered, along with a survey of the effects of governmental policies on the pricing system. Prerequisites: Economics 203, 204.

**324. Comparative Economic Systems. (3-0). Credit 3. I**
A study of the economic systems of the leading nations. Prerequisite: Economics 203.

**330. Economic Development. (3-0). Credit 3. II**
Basic concepts and problems of economic development in underdeveloped countries. This course is designed for (1) foreign students, (2) students in technical programs planning for careers in foreign service, and (3) in-service training for technical assistance personnel. Prerequisite: Approval of Head of Department.

**410. Theory of Income and Employment. (3-0). Credit 3. I** †
Primary emphasis is given to the following topics: (1) conceptual problems of measuring national income; (2) organization of the national income accounts of the United States; and (3) determinants of the aggregate levels of income, employment, and prices. Prerequisites: Economics 203, 204, 311.

**412. Public Finance. (3-0). Credit 3. II** †
A survey of financial practices at the federal, state, and local levels of government. Current public problems and the theory of public finance are analyzed with the objective of determining appropriate changes in expenditure, tax, debt, and budget policies. Prerequisites: Economics 203, 204.

**424. Economics of Transportation. (3-0). Credit 3. II**
A description of the structure and functioning of our highway, rail, water, and air transportation systems; the economic significance of transportation in our society; and an analysis of the theory and practice of regulation of the transportation industries by the Interstate Commerce Commission and other governmental agencies. Prerequisite: Economics 203.

**435. Economics of Collective Bargaining. (3-0). Credit 3. I** †
Analysis of collective bargaining as an evolutionary process and the effect of negotiated wages and supplementary benefits upon labor mobility, productivity, managerial efficiency, and the economy as a whole. Prerequisite: Economics 318 or approval of the Head of the Department.

**437. Government and Labor Relations. (2-0). Credit 2. II** †
A study of court decisions and laws regulating and protecting labor in the interest of national welfare with attention given to the social and economic environment in which such regulations were developed. Special attention is given to the major legislative acts of Congress and some of the state laws pertaining to labor relations, with some attempt to evaluate these in the light of a changing conception of labor relations. Prerequisite: Economics 318 or approval of the Head of the Department.

**443. Contemporary Economic Problems. (3-0). Credit 3. II** †

A study of current economic problems which lie within the following major areas of economic policy: economic stability, control of monopoly power, distribution of income, and international economic relations. Prerequisites: Economics 203, 204.

**481. Seminar. (1-0). Credit 1. II** †

Primarily for students majoring or minoring in economics. A study of methodology, scope, and philosophy of economic science, followed by individual investigation of some current economic problems. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. History of Economic Thought. (4-0). Credit 4. I**

Primary emphasis is given to the classical period of 1776-1848, although a brief survey of pre-classical economic thought is made at the beginning of the course. Students are expected to read extensively in original sources, and special attention is devoted to the works of Smith, Malthus, West, Ricardo, and Mill. Prerequisite: Approval of the Head of the Department.

**602. History of Economic Thought. (4-0). Credit 4. II**

Following a general survey of the wage-fund controversy, an intensive study is made of marginal utility theory as developed by Menger, Jevons, Boehm Bawerk, etc., followed by the neo-classical period. The final portion of the course is devoted to the synthesis of classical and marginal utility theory found in Marshall's system. Prerequisite: Approval of the Head of the Department.

**606. Economics of Labor. (4-0). Credit 4. II**

A survey of theories of the labor movement is followed by analysis of wage and employment theories, the effect of union policies and practices upon wages and employment, and the role of unionism in economic stability. Prerequisite: Economics 318.

**607. Contemporary Economic Theory. (4-0). Credit 4. II**

This is a survey of the more important contributions to economic thought which have been made during the last generation. The current writings of important contemporary economists are read and evaluated. Prerequisite: Economics 323.

**611. National Income Analysis. (4-0). Credit 4. I**

This course develops modern static national income analysis from a general equilibrium system. A survey is made of elementary dynamic national income analysis. The roles of fiscal and monetary policy in promoting economic stability are examined. Prerequisite: Economics 410 or approval of the Head of the Department.

**613. International Economic Policies. (3-0). Credit 3. II**

A critical examination of governmental policies toward international trade both at home and abroad; includes study of the role of the individual and the state in foreign trade; examines export and import controls, exchange control and exchange stabilization funds; considers tariff and rehabilitation policies of the government and their relation to foreign trade. Prerequisite: Economics 321.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual problems not related to a thesis or dissertation. Prerequisites: Graduate classification with major or minor in economics; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research.

## Department of Education and Psychology

Professor G. P. Parker,
Professors D. F. Parry, W. A. Varvel; Associate Professors P. R. Hensarling, M. S. Kavanaugh, S. A. Kerley; Assistant Professors D. G. Barker, D. M. Estes; Instructor R. L. Provost

### EDUCATION

**121. An Introduction to Education. (3-0). Credit 3. I, II**
A survey course in the social foundations of American education.

**321. Secondary School Methods. (3-0). Credit 3. I, S**
Methods of teaching high school subjects; for students who expect to teach in secondary schools.

**421. History and Philosophy of Education. (3-0). Credit 3. I, S** †
An evaluation of the educational achievements of the various nations and people of the western world; the development of the social, religious, political, and cultural beliefs and attitudes that underlie American education today. Prerequisite: Six hours of education.

**425. Supervised Student Teaching. (2-12). Credit 6. I, II**
Observation and participation in classroom activities. Techniques of teaching the student's special subjects. Two hours per week devoted to student's problems. Preparation of units of work preparatory to teaching. Supervised teaching. Prerequisites: Senior classification; approval of the Head of the Department.

**426. Tests and Measurements. (3-0). Credit 3. II, S** †
The development of scientific measurement. The fundamental principles of sound measurement and an intensive study of the methods of appraising achievements of instructional objectives. Primary emphasis upon methods of constructing teacher-made objective tests and techniques for improving other types of written examinations. Prerequisite: Education 321 or the equivalent.

**427. Principles of Guidance. (3-0). Credit 3. I, S** †
Introduction to the field of guidance and student personnel work. Treatment of principles underlying the aims, methods, and instruments employed in counseling and guidance. Attention to relationship of instruction and guidance. Prerequisite: Psychology 301 or a course in general psychology.

**436. Organization and Administration of the Elementary School. (3-0). Credit 3. S** †
The functional study of the participation in, and the organization and administration of the elementary school. Designed to meet the needs of elementary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education.

**437. Organization and Administration of the Secondary School. (3-0). Credit 3. II, S** †
The functional study of the participation in, and the organization and administration of the secondary school. Designed to meet the needs of secondary school principals, supervisors, teachers, and school superintendents. Prerequisite: Twelve hours of education or the equivalent.

**439. Educational Statistics. (3-0). Credit 3. I, S** †
Statistical techniques for classroom teachers, principals, students of psychology and education, and educational research workers. Problems originating in classrooms, offices of principals, laboratories of educational investigators will be used for illustrative materials and exercises. Not open to students who have received credit for any other course in statistics. Prerequisite: Six hours of advanced education.

**443. Elementary School Curriculum.** (3-0). Credit 3. S †

Curriculum problems as they relate to the growth, development, and adjustment of the child in the elementary school. Emphasis given to the study of curriculum materials and to the resource unit approach within the modified elementary curriculum structure. Prerequisite: A previous course in elementary school methods.

**444. Secondary School Curriculum.** (3-0). Credit 3. I, S †

Inquiry into current curriculum practices and their backgrounds, basis for curriculum reorganization, emphasis upon the resource unit approach within the modified curriculum structure. Prerequisite: Education 321 or the equivalent.

## FOR GRADUATES

**601. College Teaching.** (2-0). Credit 2. I

Conceptions of higher education underlying typical programs including general education, the learning process, and effective use of techniques and instrumentalities of classroom instruction. Prerequisite: Graduate classification.

**607. Programs and Procedures in Supervision.** (3-0). Credit 3. II, S

Designed for teachers, supervisors, and administrators. Deals with the philosophy, organization, and administration of supervision of both the elementary school and the secondary school. Prerequisites: Education 321, 444 or the equivalent.

**608. Administration of Local School Finance.** (3-0). Credit 3. II, S

A study of school funds on the local school level: sources, budgeting, systems of accounting and reporting. Supply management as related to school efficiency.

**609. Public School Laws.** (3-0). Credit 3. II, S

A review of the constitutional provisions, statute laws, court decisions, and regulations governing the public schools, with special reference to Texas.

**610. Pupil Accounting.** (3-0). Credit 3. I

A study of devices to record and improve census taking and attendance; classification and promotional schemes; school record systems; school reports and pupil appraisal studies; marking systems.

**613. The School Plant.** (3-0). Credit 3. II, S

A study of plans for determining the extent and character of present and future building and equipment needs of a school unit; efficiency of present plant; operation and maintenance; planning the building program.

**615. Structural Organization and Administration.** (3-0). Credit 3. I, S

A study of educational administration in the United States through an analysis of the nature of the educational function, consideration of the implications of democracy, and the legal relations of formal education to the democratic state. Emphasis will be given to the structural organization and administration of state and local school systems. Prerequisites: Education 437; graduate classification.

**616. Administration of Staff Personnel.** (3-0). Credit 3. I, S

A study of selection, salary schedules, tenure, and promotion of teachers, including in-service training; efficiency records and ratings.

**623. Standardized Tests and Measurements.** (3-0). Credit 3. I

Use of standardized tests in instruction and guidance. Study of various tests of achievement, aptitude, interest, and personality. Methods of construction, experimental trial, and standardization of published tests. Interpretation of test results. Prerequisite: Education 426 or 439, or the equivalent.

**624. Individual Testing. (2-3). Credit 3. I**

Practicum in administration and interpretation of Stanford-Binet and Wechsler-Bellevue intelligence tests. Introduction to individual tests of personality. Prerequisites: Education 426 or 439; 623 or registration therein.

**625. Practicum in Secondary Education. (2-3). Credit 3. I**

A course designed for secondary school teachers in which a study is made of current problems of the secondary school. The student, with the advice of the instructor, will select an individual problem from the following areas: planning, including the school survey; curriculum development; life adjustment education; education for out-of-school youths and adults; evaluative criteria; counseling; supervision; citizens' committee for the public schools. Prerequisites: Individual approval; teaching experience.

**626. Practicum in Secondary Education. (2-3). Credit 3. II**

This is a continuation of Education 625. The student selects an individual secondary school problem different from the one used for Education 625.

**627. Practicum in Elementary Education. (2-3). Credit 3. I**

A course designed for elementary school teachers in which a study is made of current problems of the elementary school. The student, with the advice of the instructor, will select an individual problem from the following areas: evaluation; a detailed study of testing programs; curriculum development in specific areas; health and safety education; child growth and development; improving teaching techniques; counseling; supervision; school and community programs. Prerequisites: Individual approval; teaching experience.

**628. Practicum in Elementary Education. (2-3). Credit 3. II**

This is a continuation of Education 627. The student selects an individual elementary school problem different from the one used for Education 627.

**629. Practicum in Counseling and Guidance. (2-3). Credit 3. II**

Supervised practice in individual counseling and group guidance. Cases assigned in Counseling and Guidance Center and local public schools. Prerequisites: Education 624, 631.

**631. Techniques of Counseling. (3-0). Credit 3. II**

Methods of gathering, analyzing, and interpreting case data in counseling. Analysis of dynamics of counselor-counselee relationship. Interviewing techniques. Use of test results in counseling. Prerequisites: Education 427 or 635, 623; Psychology 634.

**632. Educational and Occupational Information. (3-0). Credit 3. II, S**

Sources, classification, and analysis of educational and occupational information. Occupational trends, local occupational surveys. The use of occupational information by the classroom teacher and the guidance specialist.

**633. Methods of Group Guidance. (3-0). Credit 3. I, S**

Methods and practices in group guidance. The homeroom, classroom, and school clubs as opportunities for guidance. Prerequisite: Education 427 or 635.

**635. Organization and Administration of Pupil Personnel Services. (3-0). Credit 3. I, S**

A course for administrators, counselors, supervisors, and teachers designed to help them develop an understanding of the role of pupil personnel services; responsibility for the techniques of evaluating the program of pupil personnel services. Prerequisite: Graduate classification.

**637. Advanced Elementary School Methods. (3-0). Credit 3. S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the elementary school level. Prerequisite: Twelve hours in elementary education or an elementary school certificate.

**638. Advanced Secondary School Methods. (3-0). Credit 3. II, S**

A study of teaching methods, devices, and techniques of learning-teaching situations on the secondary school level. Prerequisite: Twelve hours of secondary education or a secondary school certificate.

**639. Processes in Educational Leadership. (3-0). Credit 3. II, S**

An analysis of the skills and techniques of the administrator in the modern school, with emphasis on democratic leadership, teacher-administrator relationships, group processes, and evaluation of the administrative programs. Prerequisite: Twelve hours of advanced education.

**640. School-Community Relationships. (3-0). Credit 3. II, S**

Considers the total educational and social patterns of living which exist in any community. The home, the school, the church, clubs, recreation centers, and all agencies of the community are conceived collectively as dominating educational influences in the life of the child. Prerequisites: Twelve hours of advanced education: graduate classification.

**681. Seminar. (1-0). Credit 1. II**

Problems pertinent to the superintendent, principal, counselor, supervisor, and visiting teacher are selected. Recent developments and research in the different areas will be presented. Prerequisites: Eighteen hours of advanced education; approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A directed individual study of a selected problem in the field of education. Prerequisite: Graduate classification in education.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis.

## PSYCHOLOGY

**207. General Psychology. (3-0). Credit 3. I, II, S**

An introductory course dealing with the elementary principles of human behavior. Designed especially for those students majoring in the social or biological sciences, in pre-medicine, or in education. Credit cannot be obtained for both Psychology 207 and 303.

**301. Educational Psychology. (3-0). Credit 3. I, II, S**

The application of psychology to the problems of teaching. The nature and operation of the laws of learning; transfer of training; nature, measurement, and significance of individual difference; conditions that influence efficiency of learning.

**303. Psychology for Technical Students. (3-0). Credit 3. I, II, S**

An introductory course emphasizing the applications of general psychology. Designed for students of agriculture, business administration, and engineering. Credit cannot be obtained for both Psychology 207 and 303.

**305. Personality Adjustments. (3-0). Credit 3. I**

Emphasis upon adjustment problems of normal people. Principles of mental hygiene in relation to family, school, and community life. Prerequisite: Psychology 207, or 301, or 303.

**307. Child Growth and Development. (3-0). Credit 3. II**

Growth and development of the normal child from infancy to adolescence with emphasis upon the elementary school years. Prerequisite: Psychology 207, or 301, or 303.

**309. Differential Psychology. (3-0). Credit 3. I**

Individual and group differences essential to the evaluation of test results and behavior. Distribution and extent, causative factors, trait organization. Prerequisite: Psychology 207 or 303 or advanced standing in engineering.

**323. Psychology of Adolescence. (3-0). Credit 3. I, II, S**

The psychological problems of the normal teen-age individual, including the consideration of the ways and means of aiding youth to meet these problems constructively. Prerequisite: Psychology 207, or 301, or 303.

**401. Industrial Psychology. (3-0). Credit 3. I, II, S**

Significance of individual differences in industry; instruments and techniques of selecting and placing personnel; motivating, training, and supervising the worker; nature and control of fatigue; psychological aspects of labor relations; morale and attitude measurement; industrial counseling. Prerequisite: Psychology 207, or 303, or advanced standing in industrial engineering or industrial technology.

**403. Dynamics of Human Behavior. (3-0). Credit 3. II** †

The motivation of behavior and the mechanisms of adjustment to conflict. Types of maladjustment and their causation. The development and integration of the personality. Theories of personality. Prerequisites: Psychology 207 or 301 or 303, and 305 or graduate classification in education or sociology.

**406. Psychology of Learning. (3-0). Credit 3. II**

A survey of the significant concepts, experimental methods, and principles of learning. Prerequisite: Psychology 207 or 301 or 303.

**408. Experimental Psychology. (2-3). Credit 3. II**

Applications of experimental method to psychology. Principles and techniques in areas of reaction time, simple motor phenomena, sensation, perception, learning, and social interaction. Prerequisite: Psychology 406 or advanced standing in industrial engineering.

### FOR GRADUATES

**634. Principles of Human Development. (3-0). Credit 3. I, S**

Biological, psychological, and cultural interrelationships in human development. Emphasis upon principles and methods as illustrated in research and theoretical contributions. Experiences in procedures of child study. Prerequisite: Graduate classification.

## Department of Electrical Engineering

Professor G. D. Hallmark,
Professors H. C. Dillingham, J. P. German, L. M. Haupt, Jr., M. C. Hughes*, N. F. Rode, R. P. Ward; Associate Professors J. S. Denison, A. J. Druce; Assistant Professors H. M. Barnard, J. O. Hebert, Jr., M. G. Rekoff, Jr., E. N. Roots, Jr.; Instructors B. J. Ball, G. E. Fridel, N. W. Hass, J. B. Jones, W. P. Worley

**201. Electricity and Magnetism. (3-4). Credit 4. I, II, S**

Lectures, recitations, and problems in electricity and magnetism.

A laboratory investigation of the phenomena studied in the textbook. Prerequisite: Mathematics 120 or 209.

**214. Electrical Circuit Theory. (3-3). Credit 4. I, II, S** †

An introduction to electrical circuit theory. Complex numbers, phasor algebra, and response of single mesh and series-parallel circuits. Resonance phenomena and the poles and zeros of impedance and admittance are defined. Prerequisites: Electrical Engineering 201; registration in Mathematics 307.

**305. Electrical Circuits and Machines. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of electrical circuits, including fundamental electronic circuits, machines, and control devices. The practice is designed to familiarize the general engineering student with test procedures for and characteristics of both direct and alternating current machines. Prerequisites: Mathematics 210; Physics 219.

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*On leave of absence.

**307. Electrical Circuits. (3-3). Credit 4. I, II, S**

A study of the fundamental principles of direct and alternating current circuits.

The practice includes measurements of the circuit phenomena, including fundamental amplifiers and rectifiers. Prerequisites: Mathematics 210; Physics 219.

**308. Electrical Machinery. (2-3). Credit 3. I, II, S**

A study of the principal types of electrical machines, including their characteristics, applications, and control devices.

The practice includes actual operation and testing of electrical machinery and equipment most commonly used in industry. Prerequisite: Electrical Engineering 307.

**322. Electric and Magnetic Fields. (3-0). Credit 3. II, S**

Application of vector analysis to the theory of electric and magnetic fields. Maxwell's equations are used to study the propagation and reflection of electromagnetic waves. Prerequisites: Electrical Engineering 214; Mathematics 308 or registration therein.

**323. Electrical Circuit Theory. (3-0). Credit 3. I, II**

General circuit analysis and theorems for lumped constant, passive circuits. Steady state and transient response is studied by classical methods and by the behavior of impedance and admittance functions in the complex frequency plane. Prerequisites: Electrical Engineering 214; registration in Mathematics 308.

**324. Electrical Circuit Theory. (3-0). Credit 3. II, S**

A continuation of the study of lumped constant passage circuits, including transform methods of analysis, two terminal pair networks and three-phase circuits. Prerequisites: Electrical Engineering 323; Mathematics 308.

**325. Electronics. (3-0). Credit 3. I, II**

An introduction to the theory of electron tubes and transistors. Thermionic, gaseous, light sensitive, and cathode ray tubes; solid state devices, rectifier circuits and amplifier equivalent circuits will be covered. Prerequisites: Electrical Engineering 214, registration in 323.

**326. Electronic Circuits. (3-0). Credit 3. II, S** †

A study of the basic circuits used in radio, television, and computers. An analytical study of modulators, demodulators, oscillators, and amplifiers. Prerequisites: Electrical Engineering 325, registration in 324.

**327. Electrical Laboratory. (1-3). Credit 2. I, II**

Studies of the precision and accuracy of measurement. Electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 323, 325 or registration therein.

**328. Electrical Laboratory. (1-3). Credit 2. II, S**

Studies of the precision and accuracy of measurement, electronic instrumentation and applications to passive and active networks. Prerequisites: Electrical Engineering 322, 324, 326 or registration in these courses.

**331. Theory and Application of Electron Tubes. (3-3). Credit 4. I, S** †

For students other than electrical engineering majors. A study of theory of operation and characteristics of electronic devices and circuits with emphasis on instrumentation and control. Prerequisite: Electrical Engineering 307.

**401. Electrical Machinery. (3-0). Credit 3. I** †

A graphical and mathematical study of electrical machines, including transformers. Prerequisites: Electrical Engineering 324, registration in 403; Mathematics 308.

**402. Electrical Machinery. (3-0). Credit 3. II** †

A continuation of the study of synchronous machines; asynchronous machines, polyphase and single phase motors; rectifiers and converters and control equipment. Prerequisites: Electrical Engineering 401, 403, registration in 404.

**403. Electrical Laboratory. (0-6). Credit 2. I**

A laboratory study of the electrical machines covered in Electrical Engineering 401. Prerequisites: Electrical Engineering 324, 328, registration in 401.

**404. Electrical Laboratory. (0-6). Credit 2. II** †

A continuation of the laboratory study of electrical machines covered in Electrical Engineering 401, 402. Prerequisites: Electrical Engineering 401, 403, registration in 402.

**406. Electric Power Distribution and Transmission. (2-2). Credit 3. II** †

Lectures and recitations on the transmission and distribution of power by electrical methods including symmetrical components. Detailed calculations of line constants, lightning phenomena, switching surges, and cost estimates of transmission and distribution systems. Prerequisite: Electrical Engineering 415.

**415. Transmission Networks. (2-2). Credit 3. I** †

An analytical study of the theory of transmission lines and impedance matching devices. Hyperbolic-function treatment is generalized to apply to power, electronic, and communication circuits. The laboratory will consist of group problems and demonstrations. Prerequisites: Electrical Engineering 324; Mathematics 308.

**420. Servomechanisms and Control Devices. (3-0). Credit 3. I** †

A general study of closed-loop control devices, including electrical, hydraulic, and mechanical systems. Prerequisites: Electrical Engineering 307 or 323; Mathematics 308.

**428. Communication Circuits. (2-3). Credit 3. I, II** †

A study of the engineering principles used in wire line communications, including telephone and telegraph systems, transmission theory, inductive interference, networks, filters, loading, repeater and carrier systems. Laboratory investigations include transmission measurements on artificial lines involving the use of vacuum tube measuring devices and impedance bridges. Prerequisite: Electrical Engineering 415 or registration therein.

**432. Economic Phases of Engineering. (2-0). Credit 2. II**

Problems in the mathematics of finance, depreciation, engineering economy, accounting, distribution factors, and rates with particular reference to the electric power industry. Prerequisite: Electrical Engineering 401.

**441. Symmetrical Components of Polyphase Circuits. (3-0). Credit 3. II** †

The solution of current, voltages, and power flow during fault conditions on a power transmission system by the application of a method of symmetrical components. Prerequisite: Electrical Engineering 308 or 401.

**451. Applied Electromagnetic Theory. (3-0). Credit 3. I** †

Static boundary value problems; conformal transformation; the Schwarz transformation; rectangular harmonics; cylindrical harmonics; Bessel functions; mathematics of Bessel functions; spherical harmonics; Legendre polynomials; applications of Maxwell's equations to plane waves in dielectrics and conductors; Maxwell's equations applied to antennas; radiation; fields and power calculations; antenna impedances. Prerequisites: Electrical Engineering 322; Mathematics 308.

**452. Ultra High Frequency Techniques. (2-3). Credit 3. II** †

An introduction to the theory and practice of ultra high frequency radio wave generation, transmission, and radiation. Development of Maxwell's equations and their application to transmission of electrical energy in wave guides. Prerequisites: Electrical Engineering 322, 326.

**454. Advanced Electronic Circuits. (3-3). Credit 4. II** †

A study of the electronic circuits used for pulsing, counting, computing, and regulating and as wide band amplifiers. Transistor and tube elements will be considered. The laboratory will consist of measurements on typical devices. Prerequisite: Electrical Engineering 326.

**456. Communication Theory. (3-0). Credit 3. II** †

Introduction to the processing and transmission of information with emphasis on the mathematics and block diagrams of systems. Includes elements of information theory, effects of signal-noise ratio, methods of modulation and demodulation. Prerequisite: Electrical Engineering 454 or registration therein.

**457. Principles of Electronic Computers. (3-3). Credit 4. I** †

Organization and internal operation of analog and digital computers; function integration, addition, multiplication, and generation; analog system simulation; switching networks; Boolean algebra applied to digital computer components; analysis and synthesis of sequential devices, digital computer memories, input and output devices; the arithmetic unit. Prerequisite: Electrical Engineering 326 or registration therein.

**481. Seminar. (0-2). Credit 1. I**

Written reports and oral presentations of selected topics from current literature in the various fields of electrical engineering. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of electrical engineering. Prerequisite: Second semester senior classification.

## FOR GRADUATES

**601.* Advanced Alternating Currents. (3-4). Credit 4. I**

Wave analysis; mechanical and electrical wave analyzers; non-linear circuits; multiple winding transformer theory; transient solution of general network. The study of transients with oscillographs.

**602.* Advanced Alternating Currents. (3-4). Credit 4. II**

Steady-state and transient solution of recurrent networks, operational calculus methods of solution of circuits with lumped and distributed constants, non-linear circuits.

**605.* Linear Servomechanisms. (3-3). Credit 4. I**

A continuation of Electrical Engineering 420 to include advance topics which will extend the study of analytic methods as applied to linear systems and introduce concepts related to linear systems synthesis. Prerequisite: Electrical Engineering 420.

**606. Non-Linear Servomechanisms. (3-0). Credit 3. II**

A study of techniques available to analyze non-linear systems, discontinuous systems, and discrete data systems, and a study of associated synthesis procedures. Prerequisites: Electrical Engineering 605; Mathematics 617.

**607. Alternating Current Circuits and Machines. (3-4). Credit 4. I**

The study of transient conditions in electrical machines.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

**611. Symmetrical Components Applied to Electrical Engineering. (3-4). Credit 4. II**

The solution of unbalanced electrical circuits by means of symmetrical components; the study and measurement of machine constants by means of the oscillograph.

**624. Electronic Circuits for Instrumentation and Computation. (3-3). Credit 4. II**

Theory, analysis, and design of the electronic circuits used in instrumentation and computation. AC amplifiers, operational amplifiers, "and" circuits, "or" circuits, and "gate" circuits are included. Problems of drift compensation in DC amplifiers and closed-loop stability in multi-stage amplifiers are treated in detail. Prerequisites: Electrical Engineering 326, 457.

**626. Introduction to Electron Tube Design. (4-0). Credit 4. I**

The motion of ions in electric and magnetic fields, electron emission, and conduction through gases are studied. The applications in mass spectrometry, electron optics, and electron tube design are considered.

**628.* Design of Active Networks. (4-0). Credit 4. I**

A study of regeneration and feedback theory with emphasis on circuit design methods suitable for treatment of these topics. Prerequisites: Electrical Engineering 601; Mathematics 601 or the equivalent.

**636. Network Synthesis. (4-0). Credit 4. II**

Synthesis of electrical networks having arbitrarily specified terminal characteristics. Studies include realizability conditions, realization of general two-terminal and four-terminal networks and approximation of network specifications. Prerequisites: Electrical Engineering 601; Mathematics 601.

**637. Wave Guides and Cavities. (3-0). Credit 3. I**

Application of Maxwell's equations to the solution of guided electromagnetic fields. Course includes studies in skin effect, parallel plane wave guides, rectangular wave guides, circular wave guides, cavities, and microwave networks. Prerequisite: Electrical Engineering 451.

**638. Antennas and Propagation. (3-0). Credit 3. II**

Application of Maxwell's equations to determine the electromagnetic fields of antennas. Course includes studies in radiation, directional arrays, impedance characteristics, aperture antennas, propagation in free space, and propagation through the ionosphere. Prerequisite: Electrical Engineering 451.

**642. Transistors. (3-3). Credit 4. I, S**

Theory of junction triodes; voltage, current, power and frequency limitations. Small signal parameters and equivalent circuits for transistors; analysis of design of circuits at both small and large signal levels. Prerequisite: Electrical Engineering 326.

**653. Electronic Computer Design. (3-3). Credit 4. I, S**

Special function generation and system simulation for analog solution of both linear and non-linear differential equations, simulation techniques applied to control systems; advanced study of digital adders, subtractors, accumulators, multipliers, and dividers; digital error-detection; digital control; design of general purpose and special purpose digital computers. Prerequisite: Electrical Engineering 457.

**685. Problems. Credit 1 to 4 each semester. I, II**

Research problems of limited scope designed primarily to develop research technique.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis or dissertation.

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*In the summer session these courses may be divided into two parts, a and b, each with two hours of credit.

## Department of Engineering Graphics

Professor W. E. Street,
Professors S. M. Cleland, B. F. K. Mullins, J. P. Oliver, C. H. Ransdell, L. E. Stark; Associate Professors B. A. Hardaway, P. M. Mason; Assistant Professors N. B. Bardell, Jr., R. H. Davey, Jr., J. H. Earle

**105. Engineering Drawing. (0-6). Credit 2. I, II, S**

Care and use of drawing instruments and equipment, vertical freehand lettering, engineering geometry, view drawings, revolutions, auxiliaries, sections, engineering sketching, pictorials, dimensioning, working drawings.

**106. Descriptive Geometry. (0-6). Credit 2. I, II, S**

Point, line, and plane relationships. Bearings and slopes of lines. Contours, cuts, and fills. Strike and dip. Successive auxiliary view problems. Revolution about an axis and true length diagrams. Developments and intersections. Prerequisite: Engineering Graphics 105.

**127. Industrial Freehand Sketching. (1-3). Credit 2. II**

Basic techniques of freehand drawing in line and tone; delineation of form, textures, materials, sketching, and industrial applications of freehand drawing.

**128. Methods of Industrial Reproduction. (0-2). Credit 1. II**

Basic techniques of reproduction processes for industrial use.

**209. Nomography. (2-0). Credit 2. II, S**

To teach the theory and construction of various types of graphs that are used in upper class engineering courses and in technical reports. Prerequisites: Engineering Graphics 105, 106; Mathematics 120 or the equivalent.

**221. Building Construction Drawing. (1-3). Credit 2. II**

Architectural details in frame and masonry construction; general drawings and techniques of presentation. (For students in industrial education and building products marketing.) Prerequisite: Engineering Graphics 105 or the equivalent.

**403. Graphical Computation Devices. (1-3). Credit 2. II, S**

To teach the theory and methods of construction of graphical computation devices and to apply their use to the solutions of engineering and scientific problems. Prerequisites: Engineering Graphics 105, 106.

### FOR GRADUATES

**601. Advanced Industrial Drawing. (2-3). Credit 3. I, S**

Problems pertinent to all industrial fields. Solutions involve projections, primary auxiliary views, successive auxiliary views, revolutions, flat pattern layouts, perspective, and shades and shadows. Use of drafting machines and other special drafting equipment. Appropriate for high school and college teachers. Prerequisite: Engineering Graphics 106 or equivalent.

**603. Advanced Machine Drawing. (1-6). Credit 3. II, S**

Conventional practices, dimensioning, fastenings, machine and pictorial sketching. Empirical design including problems of stuffing boxes, piping, shafting, gears, cams, ship and aircraft parts. Use of special drafting equipment such as drafting machine, section liner, proportional dividers, erasing machines, light table, and mechanical lettering guides. Methods of reproduction. Appropriate for high school and college teachers. Prerequisite: Engineering Graphics 106 or equivalent.

**605. Spherical Projections.* (2-0). Credit 2. I, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Graphics 106 or the equivalent.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of the Graduate School.

**606. Stereographic and Clinographic Projections.*** **(2-0). Credit 2. II, S**

Advanced graphics including recent developments in drawing, review of graphical research, and related fields. Prerequisite: Engineering Graphics 106 or the equivalent.

**607. Descriptive Geometry for Teachers.*** **(4-0). Credit 4. II, S**

Fundamental concepts of descriptive geometry. The design and organization of problems and teaching devices for college teachers. Prerequisite: Engineering Graphics 106 or the equivalent.

**611. Technical Illustration.*** **(3-3). Credit 4. I, S**

Axonometric projection including shading. Design and construction of display layouts. Commercial and technical illustrating. Prerequisite: Engineering Graphics 106 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable an individual or a small group to undertake and complete with credit numerous problems in graphical communication. It may be limited investigations, laboratory work, or conferences and discussion. Prerequisites: Engineering Graphics 105, 106; graduate classification; and approval of the instructor.

## Department of English

Professor S. S. Morgan,

Professors J. P. Abbott, J. Q. Anderson, R. H. Ballinger, F. E. Ekfelt, J. Q. Hays, E. D. Hedgcock, C. D. Laverty; Associate Professors A. L. Bennett, K. E. Elmquist, C. A. Greer, H. E. Hierth, H. L. Kidd, Jr., L. J. Martin, E. E. Stokes, Jr.†; Assistant Professors R. W. Barzak, R. E. Cain, S. S. Cox, H. S. Creswell, E. P. Crittenden, C. K. Esten, R. W. Feragen, L. F. Hauer, M. A. Huggett, P. C. Hunter, Jr., J. S. Jernigan, W. B. Kadow, L. B. Keel, H. P. Kroitor, T. J. Mattern, J. F. Peirce, F. W. Powell, J. N. Shepperd, Victor Wiening; Instructors A. L. Cooke, G. E. Gott†, K. L. James, M. P. King, H. J. Luke, Jr., R. B. Nichols, F. A. Rodewald, C. E. Schatte, Allen Schrader

**100. English for Foreign Students. (3-0). Credit 3. II, S**

Fundamentals of speaking and writing in English for students whose native language is not English. Students entering the course are expected to have studied English and to be able to communicate in English. **No credit will be granted for the satisfactory completion of this course.** (See the entry for course 100 under the Department of Modern Languages.)

**103. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. Readings in modern prose (non-fiction). Emphasis on language study and the mechanics of writing. (Special sections are offered for students of high proficiency and low proficiency in writing.)

**104. Composition and Rhetoric. (3-0). Credit 3. I, II, S**

Composition, oral and written. A continuation of the study in English 103. Emphasis on the short composition and the writing of investigative papers.

**203. Introduction to Literature. (2-0). Credit 2. I, II, S**

Reading in three of the following types: plays, stories, novels, and poems, chiefly modern. Papers on the readings. Prerequisites: English 103, 104.

**207. Report Writing and Correspondence. (2-0). Credit 2. I, II**

The writing of technical reports and business letters. Prerequisites: English 103, 104.

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*Primarily for graduate students interested in education. Not available for major or minor work toward an engineering degree, except by permission of the Dean of the Graduate School.

†On leave of absence.

**210. Introduction to Logical Discourse. (2-0). Credit 2. I, II, S**

The principles of reasoning and their application in reading and writing. Prerequisites: English 103, 104.

**212. Shakespeare. (3-0). Credit 3. I, II, S**

A study of the major plays of Shakespeare, with lectures on his life, his language, and his cultural environment. Prerequisites: English 103, 104.

**231. Survey of English Literature. (3-0). Credit 3. I, II, S**

A survey of the literature of England from Anglo-Saxon times to Dr. Samuel Johnson. Prerequisites: English 103, 104.

**232. Survey of English Literature. (3-0). Credit 3. II, S**

A survey of the literature of England from mid-eighteenth century to the twentieth century. Prerequisites: English 103, 104.

**301. Writing for Professional Men. (3-0). Credit 3. I, II, S**

Advanced writing in scientific and technical fields including technical reports and papers designed for technical and scientific journals; business correspondence. Prerequisite: The completion of the freshman-sophomore program of English.

**309. The English Language. (3-0). Credit 3. I** †

Survey of the grammatical structure, vocabulary, and history of the English language, with brief discussion of related languages. Prerequisites: Two courses in sophomore English. (Offered in 1959-60 and in alternate years thereafter.)

**310. Phonetics and Pronounciation. (3-0). Credit 3. II** †

Introductory discussion of the nature of language and of language study. Detailed study of the formation of English sounds, of usage in pronounciation, and of phonetic and phonemic principles. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**315. Seventeenth Century Literature. (2-0). Credit 2. I, S**

A period course in English poetry and prose of the seventeenth century, not including Shakespeare. Prerequisites: Two courses in sophomore English.

**316. Eighteenth Century Literature. (2-0). Credit 2. I, S**

A period course in English poetry and prose of the eighteenth century. Prerequisites: Two courses in sophomore English.

**319. Report Writing. (1-0). Credit 1. I**

The preparation of technical reports in the form observed by the Petroleum Division of the A.I.M.E., the American Petroleum Institute, and the American Association of Geologists. Prerequisite: English 104.

**320. Selected Reading. (1-0). Credit 1. I, II**

The reading of five books. Objects: to teach students to read good books and to enjoy and understand good literature.

**321. Nineteenth Century Literature (Romantic). (3-0). Credit 3. I** †

A study of the intellectual tendencies of the nineteenth century as reflected in the poetry of Wordsworth, Coleridge, Byron, Shelley, Keats, and others. Prerequisites: Two courses in sophomore English.

**322. Nineteenth Century Literature (Victorian). (3-0). Credit 3. II** †

A continuation of the study in nineteenth century thought as reflected in the writings of Tennyson, Browning, Arnold, and other Victorians. Prerequisites: Two courses in sophomore English.

**325. Creative Writing. (2-0). Credit 2. I**

The writing of stories, one-act plays, essays, editorials, and feature articles. Limited to students who have made an average of C in the prerequisite courses. Prerequisites: Two courses in sophomore English.

**327. American Literature to 1870. (2-0). Credit 2. I** †

A study of American literature from the Colonial Period through the Civil War. Prerequisites: Two courses in sophomore English.

**328. American Literature from 1870 to 1920. (2-0). Credit 2. II** †

A study of American writing from Whitman and Mark Twain to Frost and Dreiser. Prerequisites: Two courses in sophomore English.

**329. Folklore and Folk Songs. (3-0). Credit 3. II**

Folklore and folk songs beginning with Old English ballads and continuing through Indian, Negro, French, and Spanish types in the United States. Prerequisite: Freshman English.

**334. Science in Literature. (3-0). Credit 3. II**

The main developments in the history of science as they are presented in the literature of the Western World. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**336. Life and Literature of the Southwest. (3-0). Credit 3. II**

A study of the culture of the Southwest as expressed in literature. Prerequisite: A course in sophomore English. (Offered in 1961-62 and in alternate years thereafter.)

**340. Modern Drama. (3-0). Credit 3. II, S** †

A study of representative plays (in translation) by such dramatists as Ibsen, Hauptmann, Rostand, and Pirandello on the Continent, and Pinero, Shaw, Synge, O'Neill, and Maxwell Anderson in England and America. Prerequisites: Two courses in sophomore English.

**350. Modern Literature. (3-0). Credit 3. I** †

British and American novelists, poets, and dramatists from about 1920 to the present, with lectures on the social and intellectual background. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**371. Great Books. (3-0). Credit 3. I, II, S**

Greek plays, Roman lives (from Plutarch), Dante's **Inferno**, Shakespeare's **King Lear**, a Russian novel, twenty English poems, a modern novel. Prerequisite: Completion of the sophomore program in English.

**372. Great Books. (3-0). Credit 3. II, S**

Offered in alternate semesters with English 371. Typical works: Homer's **Iliad**, Lucretius' **On the Nature of Things**, Chaucer's **The Canterbury Tales** (selected), Rebelais' **Gargantus and Pantagruel**, Marlowe's **Dr. Faustus**, Cervantes' **Don Quixote**, Goethe's **Faust** (Part 1), Dostoyevsky's **Crime and Punishment**, and James' **The Turn of the Screw**. Prerequisite: Completion of the sophomore program in English.

**375. Great American Writers. (2-0). Credit 2. II**

The most important works of five or six distinguished American writers of the nineteenth and twentieth centuries chosen from Emerson, Melville, Whitman, Twain, James, Glasgow, and Frost. Prerequisite: One course in sophomore English.

**381. Play Production. (2-3). Credit 3. I**

Production of plays from the point of view of the director, the actor, and the technician. Students will participate in at least two plays with some work in television. Prerequisite: Completion of the sophomore program in English.

**382. Stagecraft. (2-0). Credit 2. II**

Methods of staging plays—scene design and construction as well as stage lighting. Participation in plays scheduled. Prerequisite: Completion of the sophomore program in English.

**401. Public Speaking. (0-2). Credit 1. I, II, S**

Practice in the planning and delivery of speeches, in parliamentary procedure, and in group discussion. Prerequisite: Completion of the sophomore program in English.

**403. Speaking for Professional Men. (1-2). Credit 2. I, II, S**

Speech training for technical students in their professional fields. Speeches of social and technical interest; group discussions; parliamentary procedure. Prerequisite: Completion of sophomore program in English.

**407. Speaking and Oral Interpretation. (1-2). Credit 2. II**

Speech training with special attention to the student's professional field and instruction and practice in the oral interpretation of literature, both prose and poetry. (Students may not receive credit for both English 403 and 407.) Prerequisite: Completion of sophomore program in English.

**412. Shakespeare. (3-0). Credit 3. II**

Close attention to the plays themselves. The student will also devote time to the texts, to Elizabethan language, to Elizabethan dramatic theory and history and Shakespeare's relation to them, and to Shakespeare criticism and scholarship. Prerequisite: English 212 or six hours of 300 or 400 level courses in literature.

**428. The Novel in English. (3-0). Credit 3. I** †

A study of the novel in English in the eighteenth, nineteenth, and early twentieth centuries. Prerequisites: Two courses in sophomore English. (Offered in 1960-61 and in alternate years thereafter.)

**431. Chaucer. (3-0). Credit 3. I**

Readings from the works of Chaucer, with consideration of the institutions and society of the pre-Renaissance period and Chaucer's language. Prerequisite: English 231 or six hours of 300 or 400 level courses in English.

**461. Teaching of Language and Composition. (3-0). Credit 3. S** †

A study of administrative and teaching problems involved in high school and college courses in composition. The organization and presentation of courses designed to improve student writing; various points of view toward language study held by teachers and students of linguistics; papers written by students and graded and criticized by instructor; supervised practice in grading and criticizing of student writing; the organizing of the curriculum in English from the grades to college. The course is intended for students expecting to teach English, for teachers of other subjects, and for principals and superintendents confronted with problems of organizing and administering the English program. Prerequisite: Senior classification or approval of instructor.

**485. Problems. Credit 1 to 3. I, II, S** †

Individual supervision; no class meetings. Readings designed for the student with a major or a minor in English and selected to round out his over-all knowledge of literature and the criticism of literature. There will be written reports on the readings and a semester examination. Prerequisite: Eighteen hours of English.

## FOR GRADUATES

**613. Studies in the Renaissance. (3-0). Credit 3. I**

Reading in the poetry, prose, and drama exclusive of Shakespeare. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**616. Studies in the Eighteenth Century. (3-0). Credit 3. II**

Poetry and prose from Dryden to Blake. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**632. Studies in the Nineteenth Century. (3-0). Credit 3. I**

Romantic and Victorian writers, along with the literary, religious, and scientific issues of the century. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**675. Studies in American Literature. (3-0). Credit 3. II**

Reading in American writers, with emphasis on a particular literary development or on a literary type. Research papers. Prerequisite: Graduate classification or approval of the Head of the Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Special readings designed to supplement the student's knowledge of English and American literature in subjects which he has not studied in other courses. Research papers. Prerequisites: Graduate classification; approval of the Head of the Department.

**691. Research. Credit 1 to 4. I, II, S**

Research for thesis. Prerequisite: Graduate classification.

## Department of Entomology

Professor J. C. Gaines,
Professor V. A. Little; Associate Professors P. L. Adkisson, J. R. Brazzel, L. W. Getzin, R. L. Hanna, D. R. King, M. A. Price, N. M. Randolph, J. N. Weaver; Assistant Professors H. R. Burke, H. A. Turney

**201. General Entomology. (2-2). Credit 3. I, II, S**

A study of the principal orders of insects; the relation of anatomy and physiology of insects to control methods; the principal insecticides and their uses; the development, habits, and economic importance of the more common insects with control methods for the injurious species.

**208. Veterinary Entomology. (2-3). Credit 3. I, II**

A study of insects and other arthropods that are parasitic upon domestic animals concerned in the transmission of diseases. Methods of eradication and control are emphasized. Prerequisite: Sophomore classification in preveterinary medicine and animal husbandry.

**301. Systematic Entomology. (2-3). Credit 3. I** †

A systematic study of the orders and families of insects, and the distinguishing characteristics of representative species. The preparation of insect collection and the use of keys for identification are emphasized in practice. Prerequisite: Entomology 201 or equivalent.

**302. Systematic Entomology. (2-3). Credit 3. II** †

A continuation of Entomology 301, including orders and families of insects not included in Entomology 301. Prerequisite: Entomology 301.

**305. Insect Morphology. (2-3). Credit 3. I** †

General morphology of typical insects with special emphasis on those structures of particular importance in systematic and applied entomology. Prerequisite: Entomology 201 or equivalent.

**306. Insect Physiology. (2-3). Credit 3. II** †

Internal anatomy and principles of physiology as applied to insects. Prerequisite: Entomology 305.

**313. Biology of Insects. (2-3). Credit 3. I**

General biology and taxonomy of the classes of Arthropoda. Emphasis is placed on the orders and more important families of Hexapoda, their marks of identification, general biology, and their relations to other animals. The use of keys for the identification of insects and other arthropods is stressed in the laboratory. Prerequisite: Three hours of biological sciences.

**401. Principles of Insect Control. (2-3). Credit 3. I** †

A study of both applied and natural controls emphasizing the uses, practical application, the physical and chemical properties of the more important insecticides. Prerequisite: Entomology 201.

**402. General Economic Entomology. (2-3). Credit 3. II** †

The nature of injury, life history, habits and control of the common insects attacking stored products, cereal, forage, cotton, ornamentals, fruits, vegetables, man, household, and livestock are studied. Practical methods of insect control are demonstrated in laboratory. Prerequisite: Entomology 201.

**405. Horticultural Pests. (2-2). Credit 3. II**

This course deals with insect problems of fruit, nuts, truck crops, and ornamentals. The biologies, type of damage, and recognition of these pests are considered. Also the approved insecticidal, biological, and natural controls as well as preventive measures are studied. Prerequisite: Entomology 201 or the equivalent.

**423. Comparative Anatomy of Arthropods. (2-3). Credit 3. I**

A detailed comparison of the digestion, respiration, circulation, excretion, and nervous system of arthropods and related animals. Taxonomic characters are also stressed. Prerequisite: Entomology 305 or equivalent.

**424. Insect Ecology. (2-3). Credit 3. II**

The effect of environmental factors upon the distribution, abundance, competition, and ecological succession of insects. Prerequisite: Entomology 302 or equivalent.

**481. Seminar. (1-0). Credit 1. I, II**

Report of original investigations, current literature, and special features. Required for entomology seniors and graduate students each semester.

**485. Problems. Credit 1 to 4. I, II, S**

Individual problems for beginners in research. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**601, 602. Systematic Entomology. (3-3). Credit 4 each semester. I, II**

A taxonomic study of the orders and families, including genera and species of the class Hexapoda; a study of the International Rules of Nomenclature. A special study of some particular group of insects is required in practice. Prerequisite: Entomology 302.

**607. Economic Entomology. (3-3). Credit 4. I, S**

This course is designed chiefly for workers in vocational agriculture and the Extension Service. It includes studies of agricultural pests, their biologies, economic importance as determined by making infestation records, and the use of control measures. Also, insecticides and methods of application are considered. Prerequisite: Approval of Head of Department.

**608. Economic Entomology. (3-3). Credit 4. II**

A detailed study of insect pests, including identification, distribution, principles and methods of natural, cultural, and chemical controls. Literature and research methods are also stressed. Prerequisite: Entomology 401 or 402.

**613, 614. Morphology. (3-3). Credit 4 each semester. I, II**

A detailed study of anatomical structures of insects. Prerequisite: Entomology 305.

**615. Insect Physiology. (3-3). Credit 4. I**

A study of the physiology of respiration, circulation, digestion, and excretion; the mechanical and chemical senses of insects are considered. Prerequisite: Entomology 306 or equivalent.

**617, 618. Medical Entomology. (3-3). Credit 4 each semester. I, II**

The taxonomy and biology of parasitic insects, ticks, mites and their role in the causation and transmission of diseases affecting man and domestic animals. Prerequisite: Entomology 208 or equivalent.

**619. Insect Toxicology. (3-3). Credit 4. II**

Chemical compounds which possess toxic properties; actions of poisons on insects; evaluation of insecticides in the laboratory and field; and mathematical analysis of data. Prerequisite: Entomology 615.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Entomological problems not pertaining to a thesis or dissertation are considered. Prerequisites: Graduate classification with major or minor in entomology; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research problems on taxonomy, life histories, biological control, ecology, and physiology of insects, and the toxicology of insecticides. Prerequisite: Graduate classification.

## Department of Floriculture

Professor A. F. DeWerth;
Assistant Professor R. E. Odom; Instructor D. A. Pate

**206. Ornamental Plants. (2-2). Credit 3. I**

This course is devoted to a detailed study of trees, shrubs, and vines; their identification, adaptation to environmental conditions, value and management in landscape plantings. Prerequisite: Biology 102.

**207. Ornamental Plants. (2-2). Credit 3. II**

A continuation of Floriculture 206. Major consideration will be given to the narrow and broad-leaf evergreens. Prerequisite: Floriculture 206.

**221. Fundamentals of Floriculture. (1-3). Credit 2. I**

The position of the horticultural specialties in agriculture and the organization of the ornamental plant industries. Practice in the basic techniques used in the production and marketing of ornamental plants. Prerequisite: Biology 101.

**224. Principles of Floral Designing. (1-3). Credit 2. II**

The principles and practices involved in commercial floral designing and in arranging flowers for interior decoration.

**319. Exotic Plants. (1-3). Credit 2. I**

A detailed study of the rare and exotic ornamental plants of the tropic and subtropic zones of the world including their identification, use, and adaptation to modern living. Prerequisite: Biology 102.

**320. Garden Flowers. (1-3). Credit 2. II**

The identification and uses of annual and perennial ornamental plants and garden roses and their adaptation to the environment of the Southwest.

**325. Marketing of Ornamental Plants. (3-0). Credit 3. I**

The economic status of the horticultural specialties in the United States and Texas. The application of specialized market techniques to these products and the developments and problems involved in present-day marketing channels. Prerequisite: Economics 203.

**327. Management Techniques of Floriculture. (1-3). Credit 2. I**

A study of the specialized management practices involved in the operation of modern nurseries, greenhouses, and retail sales outlets devoted to the production and selling of ornamental plants.

**424. Propagation of Ornamental Plants. (2-2). Credit 3. II** †

Specialized study of plant propagation with emphasis on the physiological and anatomical considerations involved and the importance of their application to the commercial propagation of ornamental plants. Prerequisite: Plant Physiology and Pathology 313.

**429. Greenhouse Crop Production. (3-3). Credit 4. I** †

The application of scientific developments to the principles and practices involved in the production, harvesting, and grading of crops grown in greenhouses and other forcing structures. Prerequisites: Plant Physiology and Pathology 301, 313.

**430. Nursery Crop Production. (3-3). Credit 4. I** †

The application of scientific developments to the principles and practices involved in the production, harvesting, and grading of plants grown in the modern nursery. Prerequisites: Plant Physiology and Pathology 301, 313.

**485. Special Problems. Credit 1 to 4. I, II**

Special problems in floricultural production, marketing, or landscape architecture. May be repeated for additional credit when less than four credits have been earned. Prerequisites: Senior classification; approval of the Head of the Department.

### FOR GRADUATES

**609, 610. Experimental Floriculture. (1-6). Credit 3 each semester. I, II**

Specialized study of the genera, species, varieties and clons of woody and herbaceous ornamental plants, including form, structure, identification, and adaptability to environmental conditions and climatic variations in the Southwest. Water, temperature, light, and soil relations of ornamental plants and their modification by management practices. Specific problems of management will be studied under field and greenhouse conditions.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

This course is for students who desire to work out special problems. Students will elect work in their desired subjects after a conference with instructor in charge. Prerequisites: Genetics 301; Plant Physiology and Pathology 301, 313; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Genetics

Professor C. B. Godbey,
Professors T. C. Cartwright, R. G. Reeves*; Assistant Professors
J. E. Endrizzi, N. A. McNiel, J. D. Smith

**301. Genetics. (3-2). Credit 4. I, II, S** †

Fundamental principles of genetics: variation, heredity, the physical basis of Mendelian inheritance, the expression and interaction of genes, linkage, sex linkage, and mutation. Laboratory includes demonstrations of Mendalian ratios with Drosophila and an introduction to biometrical methods. Prerequisite: Biology 101 or 107.

**304. Plant Breeding. (3-2). Credit 4. II** †

The improvement of crops by hybridization and selection. Special breeding methods and techniques applicable to naturally self-pollinated, cross-pollinated, and asexually reproduced plants. Prerequisite: Genetics 301.

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*On leave of absence.

**306. Animal Breeding. (2-2). Credit 3. I, II** †

Genetics as applied to the problems of the animal breeder. Genetic and phenotypic effects of selection. Comparison of various selection methods such as mass selection, family selection, progeny and sib testing. Selection indexes. Systems of mating such as grading, cross-breeding, inbreeding, linebreeding, outbreeding, and random mating. Genetic analysis of pedigrees. Prerequisite: Genetics 301.

**406. Statistics. (2-2). Credit 3. I, II, S** †

A study of the binomial distribution and application; chi-square analysis; central tendencies; measures of dispersion; elementary sampling and sampling distributions; tests of hypotheses; measures of relationship; analysis of variance. Prerequisite: Mathematics 101.

**Poultry Science 414. Poultry Breeding. (2-2). Credit 3. I** †

See Department of Poultry Science for a full description of this course.

## FOR GRADUATES

**603. Genetics. (3-0). Credit 3. I**

Advanced study of genetics with special attention focused on the evidence supporting the principles of heredity. Development of fundamental concepts including dominance, the chromosome theory of heredity and linkage, sexuality, mutation and position effect, the gene concept and extra nuclear inheritance. Prerequisites: Genetics 301; approval of the instructor.

**604. Genetics Laboratory. (0-3). Credit 1. I**

Inheritance studies principally with Drosophila including laboratory techniques and methods. Arranged to complement Genetics 603 and required for genetics majors.

**605. Statistics. (3-3). Credit 4. I**

Analysis of variance, covariance analysis, multiple regression, introduction to experimental designs. Prerequisite: Genetics 406.

**606. Biometry. (3-3). Credit 4. II**

Methods of constructing and analyzing designs for experimental investigations. Simple and partial confounded factorial designs; treatment of missing data. Prerequisite: Genetics 605.

**612. Plant Genetics. (3-3). Credit 4. II**

Specialized study of genetics as related to plant breeding. Emphasis is placed on quantitative inheritance, heterosis, selection, ploidy, reproductive systems and the processing of quantitative data. Prerequisites: Genetics 304, 406, 603.

**616. Animal Genetics. (3-3) Credit 4. II**

The specialized study of animal genetics and population genetics especially as related to the improvement of herds, flocks or other groups within a species. Emphasis is placed on causes of change in gene frequency, methods of selection, systems of mating and heterosis; the inter-relationship among these forces and their measurement. Prerequisites: Genetics 306, 406, 603.

**620. Cytogenetics. (3-3). Credit 4. II**

A study of correlated genetical and cytological phenomena. Prerequisites: Biology 615; Genetics 301.

**623. Special Topics in Genetics. Credit 2 to 4. I**

Content of this course will depend upon the interest of the students and the specialty of the instructor. Lecturers who have attained distinction in genetics or related fields will conduct this course.

**624. Statistical Genetics. (2-0). Credit 2. I**

Probability as applied to genetic systems; the derivation of genetic expectations; the theory of inbreeding; estimation and testing of genetic parameters; statistical aspects of quantitative inheritance; the partition of variance; covariances among relatives; mathematical models for quantitative inheritance. Prerequisites: Genetics 406, 603; approval of the instructor.

**625. Speciation. (2-0). Credit 2. I**

A study of the genetic and environmental forces which operate in species formation together with a critical examination and comparison of the more important current explanations of speciation. Prerequisites: Biology 349; Genetics 301.

**628. Animal Breeding. (2-0). Credit 2. I**

A course designed to acquaint the student with the current status of knowledge in the field of animal breeding through a critical survey of the literature. Emphasis is given papers dealing with problems of breeding for quantitative traits of economic importance in farm animals including beef cattle, dairy cattle, poultry, sheep, and swine. Considerable attention is focused on methods which have been used or are available for use in studying animal breeding problems. Prerequisite: Genetics 616.

**631. Biochemical Genetics. (2-0). Credit 2. I**

A study of the genetic control of cellular metabolism and a theoretical consideration of the mechanism of gene action. A consideration of nutrition and the genetic capacity for biosynthesis, gene-enzyme relationships, pleiotropism, plasmagenes, and the chemical nature of the agents of heredity. Prerequisites: Biochemistry and Nutrition 410 or Chemistry 227; Genetics 301.

**633. Forest Genetics. (3-0). Credit 3. I**

Specialized study of genetics as applied to forest trees; forest genetics, forest tree improvement and forest tree breeding, with emphasis on genetics of conifers, especially pines. Fundamental and applied phases are included. Prerequisites: Genetics 603; approval of the instructor.

**634. Forest Genetics Laboratory. (0-6). Credit 2. II**

Methods and techniques in forest genetics, forest tree breeding; crossing, grafting, air layering, field layouts, seed handling, greenhouse techniques. Prerequisite: Genetics 633.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Technical research problems subject to approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Prerequisite: Genetics 603.

**Poultry Science 613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

See Department of Poultry Science for a full description of this course.

## Department of Geography

Professor G. W. Schlesselman;
Associate Professor E. B. Doran, Jr.

**201. Principles of Geography. (3-0). Credit 3. I, II, S**

The study of human society in relation to the physical conditions and natural resources of the earth. This course should make clear such factors of the natural environment as location, climate, relief, soils, surface and underground water, minerals and forests, with emphasis on the human response to these factors.

**203. Physical Geography. (3-3). Credit 4. I, II**

This course consists of a systematic description and interpretation of the distribution patterns and the regional associations of natural phenomena on the face of the earth.

**204. Economic Geography. (3-0). Credit 3. I, II**

A study of the commercial regions of the world, dealing with the production types or occupations, such as grazing, plantation farming, grain farming, fishing, lumbering, mining, and manufacturing.

**302. Geography of Europe. (3-0). Credit 3. II**

A geographical survey of Europe as a whole and of the individual countries.

**303. Geography of South America. (3-0). Credit 3. I**

Investigations of trade opportunities in South America. The economic activities of the major geographic regions as reflecting the present day utilization of the natural resources. Possibilities of future development.

**304. Geography of Asia. (3-0). Credit 3. II**

A general study of the continent of Asia and a more detailed study of selected regions.

**306. Meteorology. (3-0). Credit 3. I**

This course aims to present concisely and systematically the science of meteorology in its present state of development. The primary purpose is to set forth the facts and principles concerning the behavior and responses of the atmosphere.

**310. Climatology. (3-0). Credit 3. II**

A study of the nature and elements of climate and the factors that give rise to climatic differences and that determine the distribution of climatic types.

**312. Conservation of Natural Resources. (3-0). Credit 3. II**

A study of natural resources including ways and means of insuring wise utilization of essential or strategic resources.

**320. Geography of the Pacific Basin. (3-0). Credit 3. I**

Geographic aspects of the Pacific Ocean area. Physical characteristics, native people, discovery and exploration, political and economic factors; regional studies of sub-areas.

**401. International Political Geography. (3-0). Credit 3. I** †

A study of some of the present social and political problems of world powers and also the weaker nations. An effort to find geographic factors back of these problems and possible geographic adjustments.

**485. Problems. Credit 1 to 4. I, II**

Individually supervised research or advanced study on restricted areas not covered in regular courses. Prerequisite: Approval of the Head of the Department.

## FOR GRADUATES

**601. Economic Geography. (4-0). Credit 4. I**

A regional survey of the world distribution of major agricultural and industrial commodities with particular attention to the causal action of natural, social, and economic factors. (Offered in 1961-62 and in alternate years thereafter.)

## Department of Geology and Geophysics

Professor S. A. Lynch,
Professors H. R. Blank, Peter Dehlinger, T. J. Parker, W. L. Russell*, F. E. Smith; Associate Professors K. J. Koenig, M. C. Schroeder, C. L. Seward, Jr.; Assistant Professor S. H. Yungul

### GEOLOGY

**201. General Geology. (3-0). Credit 3. I, II**

The agents and processes that have produced the surface features of the earth and the structure of the earth's crust. Prerequisites: Chemistry 101 or equivalent; registration in Geology 203 or 207; registration in Geology 209 for majors in geology, geophysics, and geological engineering.

**203. Crystallography and Mineralogy. (2-6). Credit 4. I**

Crystallography and descriptive mineralogy. Sight recognition of crystal forms and of common minerals. Prerequisites: Chemistry 102; Engineering Graphics 106; Mathematics 102, 103.

**204. Mineralogy and Rock Study. (1-3). Credit 2. II, S**

Continuation of Geology 203. Recognition and classification of common rocks by their megascopic characteristics. Prerequisites: Chemistry 207 or registration therein; Geology 203.

**205. Elementary Geology. (3-3). Credit 4. I, II**

General principles of physical geology, physiography, geologic processes, and an introduction to historical geology. Laboratory work on common minerals, rocks, and maps. Primarily for arts and science students.

**207. Mineralogy and Rock Study. (2-6). Credit 4. I**

Practical hand specimen determination of common minerals and rocks by means of their physical properties. Study of well cuttings and cores. This course should be taken simultaneously with Geology 201. A course designed for petroleum engineers. Prerequisites: Chemistry 102; Mathematics 103 or the equivalent.

**209. Introduction to Field Work. (0-3). Credit 1. I**

One-half day each week studying geologic processes. Scientific methods of field work are stressed. Should be taken concurrently with Geology 201 and cannot be taken for credit after credit is received for Geology 210.

**210. Historical Geology. (3-3). Credit 4. II, S**

Principles of stratigraphy and paleontology, the physical and organic record of the earth's history, hypotheses of the earth's origin. Prerequisites: Chemistry 102; Engineering Graphics 106; Geology 201 and 203, or 201 and 207, or 205 and approval of Head of Department; Mathematics 102, 103.

**299. Field Geology. Credit 2. Intersession**

Geological observations and mapping in an area exhibiting diversity of rock types, structures, and physiography. Prerequisites: Geology 201; approval of Head of Department.

**300. Field Geology. Credit 6. S**

Geologic mapping in selected areas in the Llano Uplift and the Marathon Basin. Written report. Prerequisites: Civil Engineering 208; Geology 204, 305, 306, 312.

**303. Petrography and Petrology. (2-3). Credit 3. I** †

Principles of optical mineralogy; identification of minerals in fragments and thin sections by use of the petrographic microscope; thin section study of igneous rocks, and their classification. Prerequisites: Chemistry 207; Geology 204.

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*On leave of absence.

**304. Sedimentary Petrography. (2-3). Credit 3. II** †

Microscopic study of sedimentary and metamorphic rocks in thin sections; heavy mineral analysis; description, origin, and classification of sedimentary and metamorphic rocks. Prerequisite: Geology 303.

**305. Invertebrate Paleontology. (3-3). Credit 4. I**

The morphology, classification, and geologic range of the principal invertebrate groups. Prerequisite: Geology 210.

**306. Stratigraphy. (3-3). Credit 4. II**

Stratigraphic studies of the United States with emphasis on the Gulf Coastal Plain formations and their correlation by means of invertebrate fossils. Laboratory studies consist of stratigraphic principles and the changing faunas through geologic time. Prerequisite: Geology 305.

**309. Agricultural Geology. (3-3). Credit 4. II**

Erosion, transportation, and deposition by water, wind, and ice. Chemical and physical processes of development and destruction of soils. Origin, development, and interpretation of surface features of the earth. Elements of earth structure and geologic history. Earthquakes, volcanoes, and mountains. Laboratory work in determination of rock-making minerals and common rocks and interpretation of topographic and geologic maps.

**312. Structural Geology. (2-3). Credit 3. II**

The interpretation of rock structures; their relation to stratigraphic, physiographic, and economic problems. Prerequisites: Geology 201, 204 or 207, 210.

**315. Principles of Sedimentation. (2-3). Credit 3. I**

Factors of environment, production, transportation, and deposition of sediments; products resulting from the operation of sedimentary processes; structures, textures, and colors of sediments. Laboratory work in collecting and sampling, mechanical analysis, methods of analyzing and presenting data. Prerequisites: Chemistry 207; Geology 201, 203, 204, 210.

**320. Geology for Civil Engineers. (2-3). Credit 3. I, II**

Principles of dynamic and structural geology and study of common minerals and rocks with their relationships and applications to construction, foundations, and excavation. Prerequisite: Sophomore classification in civil engineering.

**399. Field Geology of the Gulf Coast Tertiary. Credit 6. S**

Mapping, stratigraphy, and structure in the Tertiary of the Gulf Coast area. Given as a summer field camp. May be used to substitute for Geology 433 and 4 hours of technical elective. Prerequisite: Geology 300.

**404. Geology of Petroleum. (2-3). Credit 3. I**

Origin, migration, and accumulation of petroleum. Typical United States oil and gas fields. Laboratory work in subsurface geology. Prerequisites: Geology 300, 306, 312.

**406. Economic Geology. (3-0). Credit 3. I** †

The application of principles of geology, chemistry, and physics to the formation of useful minerals and rocks and a general survey of such deposits. Prerequisites: Chemistry 344; Geology 300, 306, 312.

**409. Geology of Non-Metallics Other than Petroleum. (3-0). Credit 3. II** †

The mineralogy, stratigraphic, and structural relations, origin, geographic distribution, uses, and economics of non-metallic mineral deposits other than petroleum. Prerequisites: Chemistry 344; Geology 300, 306, 312.

**422. Natural Structural Materials. (2-3). Credit 3. II**

Building stones and stone products, with special emphasis on clays and clay products, their qualities, occurrences, uses, and processes of fabrication and manufacture. For students registered in architecture or engineering. Prerequisite: Junior classification.

**423. Micropaleontology. (1-6). Credit 3. II** †

A systematic survey of the important groups of micro-fauna with particular emphasis on their classification and use. Prerequisite: Geology 305.

**425. Subsurface Geology. (2-3). Credit 3. II** †

Study of well cuttings and cores; electrical, radioactive, drilling time, and caliper logs. Preparation of subsurface contour maps and cross sections. Prerequisites: Geology 300, 404; approval of Head of Department.

**431. Geomorphology. (2-3). Credit 3. I**

Principles and fundamentals of geomorphology. Laboratory work in advanced map interpretation. Prerequisites: Geology 300, 306, 312.

**433. Field Geology. (0-6). Credit 2. II** †

Two full afternoons per week devoted to the acquirement of techniques of field geology in areas adjacent to the campus. Prerequisites: Geology 300, 306.

**437. Cenozoic Micropaleontology. (1-6). Credit 3. I** †

Cenozoic micro-fauna of the Gulf Coast Province with emphasis on subsurface correlation. Prerequisite: Geology 423.

**441. Advanced Engineering Geology. (3-3). Credit 4. I** †

A survey of those phases of mineralogy, petrology, historical geology, structural geology, and sedimentation that may be applied to engineering problems. Not available to geology or petroleum engineering majors. Prerequisites: Senior classification; approval of Head of Department.

**443. Paleontology. (2-3). Credit 3. II**

Advanced invertebrate paleontology—megafossils. Prerequisite: Geology 305.

**481. Seminar. (1-0). Credit 1. I**

Review of current literature and technical developments. Discussion of certain legal aspects of the petroleum industry. Each student will make both oral and written reports. Prerequisites: Geology 300, 306, 312.

**482. Seminar. (1-0). Credit 1. II**

Continuation of Geology 481. Each student will prepare more advanced reports. Prerequisites: Geology 300, 306, 312.

**485. Problems. Credit 1 to 3. I, II, S**

Advanced problems in geology.

## FOR GRADUATES

**600. Earth Science for Secondary School Teachers. (2-3). Credit 3. S**

Survey of the fundamental principles of physical geology, geologic processes, and earth history including the origin and nature of the solar system. Designed to aid secondary school instructors in presenting earth sciences. Prerequisites: Graduate classification; approval of Head of Department.

**601. Advanced Research Techniques. (1-0). Credit 1. I**

An introduction to modern instrumentation techniques and methods used in geology. Prerequisite: Graduate classification.

**609. Field Geology. Credit 2 to 6. I, II, S**

Systematic geologic surveying of selected areas. Prerequisite: Geology 300.

**612. Structural Geology. (3-0). Credit 3. I**

A detailed study of geologic structures and a consideration of theories regarding earth movements, with selected readings. Prerequisite: Geology 312.

**616. Micropaleontology. (1-6). Credit 3. I**

Study of microscopic fossils and their uses in correlation. Laboratory work in the examination of well samples. Prerequisite: Geology 423.

**618. Sedimentation. (3-0). Credit 3. II**

Investigation of processes of sedimentation with analytical laboratory work on sedimentary rocks. Seminar. Prerequisite: Geology 315.

**619. Petroleum Geology. (3-0). Credit 3. II**

A theoretical study of some of the problems in petroleum geology. Prerequisite: Geology 404.

**620. Geology of Ground Water. (3-0). Credit 3. I**

Principles of occurrence and movement of water beneath the earth's surface, and the influence of various geologic situations upon its behavior. Factors applying to estimates of supply. Engineering aspects of ground water.

**622. Stratigraphy. (3-0). Credit 3. I**

Sources and depositional environment of sediments, character and relation of sedimentary strata, and the principles involved in delimiting, correlating, and naming stratigraphic units.

**625. Advanced Ground Water Geology. (3-0). Credit 3. II**

Seminar course in the application of the principles of advanced geology to the development and use of ground water supplies. Prerequisites: Geology 620 or the equivalent; approval of Head of Department.

**627. Continental Evolution Outside of North America. (2-0). Credit 2. II**

A reading and conference course on the available literature, dealing with the basic geology of areas outside of North America in which industries and governments are asking for the services of American geologists. Designed for students contemplating foreign service. Areas to be studied will be suited to individual needs.

**629. Structural Framework of North America. (3-0). Credit 3. II**

Description of the important geologic structures of North America and of the development of regional structural features in geological times. Prerequisite: Graduate classification.

**631. Geology in Engineering Construction. (3-0). Credit 3. II**

Geologic principles applied to the construction of highways, foundations, bridge abutments and piers, tunnels, dams, reservoirs, etc. Construction materials. Test borings and their interpretation. Prerequisites: Graduate classification; approval of instructor.

**639. Paleozoic and Mesozoic Paleontology. (3-0). Credit 3. I**

Study of the important faunas of these eras. Prerequisites: Graduate classification; approval of Head of Department.

**640. Cenozoic Paleontology. (3-0). Credit 3. II**

Study of the important faunas of this era with emphasis on the megafossils of the Gulf Coast. Prerequisites: Graduate classification; approval of Head of Department.

**643. Paleozoic Stratigraphy. (3-0). Credit 3. II**

Stratigraphy of the Paleozoic System with particular emphasis on the Paleozoic of West Texas and Oklahoma. Prerequisites: Graduate classification; approval of Head of Department.

**644. Mesozoic Stratigraphy. (3-0). Credit 3. II**

Study of the stratigraphy of the Mesozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**645. Cenozoic Stratigraphy. (3-0). Credit 3. II**

Study of the Cenozoic System. Prerequisites: Graduate classification; approval of Head of Department.

**646. Gulf Coast Stratigraphy. (3-0). Credit 3. II**

Detailed study of the Mesozoic and Cenozoic Systems of the Gulf Embayment. Prerequisites: Graduate classification; approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geology to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geological problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geology. Research for thesis or dissertation.

## GEOPHYSICS

**435. Principles of Geophysical Exploration. (3-3). Credit 4. I** †

Principles of the different methods used in geophysical exploration with emphasis on the interpretation of geophysical data and physical properties of rocks. Prerequisites: Geology 312; Mathematics 210; Physics 219; approval of Head of Department for majors in other departments.

**436. Seismic Exploration. (2-3). Credit 3. II** †

Study of seismic investigations with artificial sources, including field procedures, instrumentation, and interpretation of data. Prerequisite: Geophysics 435.

**446. Physics of the Earth. (3-0). Credit 3. II** †

A study of the earth's elastic and inelastic behavior, its gravitational, magnetic, electrical and thermal fields, the effect of forces acting within the earth, and implications of these factors during geologic time. Prerequisites: Geology 312; Mathematics 210; Physics 219; approval of Head of Department for majors in other departments.

**485. Problems. Credit 1 to 3. I, II, S** †

Advanced problems in geophysics.

## FOR GRADUATES

**651. Theoretical Seismology. (3-0). Credit 3. I**

Mathematical development of elasticity theory and stress waves in bounded and unbounded solid media. Prerequisites: Geophysics 435 or registration therein; Mathematics 308 or registration therein.

**653. Gravity and Magnetic Methods. (3-0). Credit 3. II**

Study of the earth's gravity and magnetic fields; the role of gravity in geodesy; methods, instruments, and interpretation of data in gravity and magnetic methods of exploration. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**655. Electrical and Radioactivity Methods. (2-0). Credit 2. II**

Study of procedures, instruments, and interpretation of data obtained from electrical, electromagnetic, and radioactivity methods of exploration. Minor emphasis is on geothermal and geochemical methods. Prerequisites: Geophysics 435; Mathematics 308 or registration therein.

**657. Earthquake Seismology. (2-0). Credit 2. I**

Study of earthquakes, their causes, effects, method of location, determination of wave paths, interpretation of deep structures; and instruments used for recording. Prerequisites: Geophysics 435, 651 or registration therein.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course to enable graduate students with a major or minor in geophysics to undertake and complete with credit limited investigations which do not fall within their thesis or dissertation research and are not covered in the established curricula. Geophysical problems in engineering are included. Prerequisites: Graduate classification; approval of Head of Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on problems in various phases of geophysics. Research for thesis or dissertation.

## Department of Health and Physical Education

Professor C. E. Tishler,
Professors A. D. Adamson, W. M. Dowell, C. W. Landiss, W. L. Penberthy, H. B. Segrest; Associate Professors P. M. Andrews, Emil Mamaliga, L. L. Palmer, N. A. Ponthieux; Assistant Professors L. A. Harrison, Jr., R. K. Wieder; Instructor H. H. Walton

### HEALTH EDUCATION

**216. First Aid. (0-3). Credit 1. I, II, S**

Prepares students for Red Cross Standard, Advanced, and Instructor's First Aid Certificates.

**218. Athletic Injuries. (1-3). Credit 2. II**

A study of the conditioning and training of the individual and team; care and prevention of injuries. Prerequisites: Biology 219; Health Education 216.

**415. Secondary School Health Education. (3-0). Credit 3. I, S** †

A study of health problems; needs of the individual; cooperation of home and community; resources for health in community, state, and nation; techniques of evaluation. Prerequisites: Biology 225; approval of instructor.

**421. Elementary School Health Education. (3-0). Credit 3. II** †

A study of modern trends and methods in the elementary school health program; survey of materials and agencies and their value to an adequate health program. Prerequisites: Biology 225; approval of instructor.

### FOR GRADUATES

**631. Community and Public Health. (3-0). Credit 3. S**

A study of community health problems and of public health measures to solve them. Typical organizations and specific functions of state and local health departments; relationship of local health department to state and federal health agencies and programs. Prerequisite: Health Education 415 or 421. (Offered in 1961-62 and in alternate years thereafter.)

### PHYSICAL EDUCATION

Physical Education 101, 102, 201, and 202 are required in all curricula. Those students who are unable to pass a prescribed swimming test will be required to register for elementary swimming instruction, and students who are unable to pass a physical fitness test will be urged to register for general conditioning activities. All others may elect to register for one of the following activities: adapted activities, badminton, basketball, bowling, boxing, conditioning, diving, fencing, golf, gymnastics, handball, life saving, soccer, speedball, swimming, tennis, trampolining, volleyball, water polo, weight training, or wrestling. The purpose of these courses is to teach the student through instruction and practice the fundamental knowledge and skills of at least two activities in which he will be able to participate in adult life. No student will be permitted to repeat an activity unless he has failed it.

Students may elect Physical Education 301, 302 for credit of one hour each after having completed the required courses.

**101. Required Physical Education. (0-2). No credit. I, II**

**102. Required Physical Education. (0-2). No credit. I, II**

**201. Required Physical Education. (0-2). No credit. I, II**

**202. Required Physical Education. (0-2). No credit. I, II**

**210. Life Saving and Pool Management. (1-3). Credit 2. II**
Designed to qualify students for Red Cross Senior Life Saving and Instructor's certificates; includes a study of sanitary codes and pool sanitation, problems of pool and waterfront management; selection of personnel. Prerequisite: Advanced swimming. (Offered in 1960-61 and in alternate years thereafter.)

**211. Physical Education Activities. (1-3). Credit 2. I**
A basic course designed to provide instruction and development of skill in physical education activities.

**213. Introduction to Health and Physical Education. (3-0). Credit 3. I, II**
The approach, fundamental principles and application of principles; definition, traditions, developments, psychology, aims, objectives, and results of physical education; building a program of health and physical education. Prerequisites: Sophomore classification; approval of instructor.

**221. Safety Education. (2-0). Credit 2. I**
A study of the general program of safety education; accidents, preventive measures, traffic safety, safety at home, school, and work; visual aids, safety projects, special programs; utilization of agencies outside of school.

**226. Introduction to Recreation. (2-0). Credit 2. II**
A study of the nature, extent, significance, and history of recreation; leadership personnel, its function, training, and selection; planning recreation areas and facilities; program planning and activity organization.

**251. Coaching of Basketball. (1-3). Credit 2. I**
Theory and practice of coaching fundamentals in basketball.

**253. Coaching of Baseball. (1-3). Credit 2. II**
Teaching of individual techniques; position play; training; team offensive and defensive strategy. Prerequisites: Junior classification; approval of instructor. (Offered in 1961-62 and in alternate years thereafter.)

**255. Coaching of Track. (1-3). Credit 2. I**
Theory and practice of coaching fundamentals in track and field events.

**301. Physical Education. (0-3). Credit 1. I, II**
This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**302. Physical Education. (0-3). Credit 1. I, II**
This course may be elected by students having completed the two required years of physical education. It is designed to give students an opportunity to improve skill in carry-over sports.

**315. Elementary School Physical Education. (3-0). Credit 3. II**
Organization of physical activities in public schools; methods in teaching games used in public school programs. Prerequisites: Junior classification; approval of instructor.

**316. Secondary School Physical Education. (3-0). Credit 3. I**

Class organization, control, and management; methods of presenting subject matter; special methods in activities. Prerequisites: Junior classification; approval of instructor.

**317. Coaching of Football. (1-3). Credit 2. II**

Teaching of fundamentals; individual techniques; training; offensive and defensive strategy; officiating.

**321. Coaching of Tennis. (1-3). Credit 2. I**

Analysis, theory and practice of tennis strokes; strategy; methods of coaching; organizing and conducting tournaments. Prerequisites: Junior classification; approval of the instructor. (Offered in 1961-62 and in alternate years thereafter.)

**325. Outdoor Activities. (2-0). Credit 2. II**

A course designed to acquaint the student with the function of the camp and outdoor activities as educational agencies through the medium of practical projects and activity, organization, problems, and modern programs in the various areas.

**331. Sports in American Culture. (3-0). Credit 3. I**

A study of the history and evolution of sports; the role and cultural implications of sports in American democracy; the Olympic games; sports and their function in American schools and colleges.

**423. Administration of Health and Physical Education. (3-0). Credit 3. II, S** †

Administrative problems involved in the coordination of the health, physical education, intramural, and athletic areas in a comprehensive program of physical education. Prerequisites: Biology 225; Health Education 415; Physical Education 213.

**425. Tests and Measurements. (3-0). Credit 3. I, II, S** †

Use, interpretation, evaluation, and administration of existing tests in health and physical education; application of elementary statistical procedures. Prerequisites: Health Education 415; senior classification.

**427. Remedial Exercises. (3-0). Credit 3. I**

Elementary techniques in diagnosing functional and structural defects; procedures of individual exercise with emphasis on preventive and remedial measures. Prerequisites: Biology 219, 220; approval of instructor.

**450. Directed Teaching. (2-12). Credit 6. I, II**

Construction of lesson plans, observation and supervised practice teaching in public schools. Prerequisites: Physical Education 316; senior classification.

**481. Seminar. (1-0). Credit 1. I, II, S**

General discussion of professional ethics and current problems relating to health, physical education, and athletics. Prerequisite: Senior classification.

## FOR GRADUATES

**601. Survey of Research. (3-0). Credit 3. S**

A study of published reports and research in the field of health and physical education. Prerequisite: Education 426 or Physical Education 425.

**603. Coaching and Officiating. (3-0). Credit 3. S**

Advanced coaching and officiating techniques in football, basketball, track, and baseball. Prerequisites: Teaching and coaching experience.

**610. Administration of Interschool Athletics. (2-0). Credit 2. S**

This course is designed for school superintendents, principals, and athletic directors. A study of the University Interscholastic League rules and regulations and the various problems confronting the school administrator in administration of the interschool athletic program. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**614. Philosophy and Principles. (3-0). Credit 3. S**

Divergent origins, leaders, conditions, and forces affecting the development of health and physical education. Critical analysis of objectives. Principles of education, psychology, and physiology, and their implications in health and physical education. Prerequisite: General prerequisite for minor. (Offered in 1961-62 and in alternate years thereafter.)

**622. Supervision of Health and Physical Education. (3-0). Credit 3. S**

Methods and policies of the school supervisor; conferences, planning and presenting the program, evaluating results, improving teachers-in-service. Prerequisite: Physical Education 423. (Offered in 1960-61 and in alternate years thereafter.)

**636. Advanced Tests and Measurements. (3-0). Credit 3. S**

Critical study of tests and measurements available; methods of constructing and evaluating new tests and measurements. Prerequisite: Physical Education 425. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1. I, II, S**

General discussions of laws, legislative certification, professional ethics, and other current problems relating to health, physical education, and recreation. Prerequisites: Eighteen hours of education and physical education; graduate classification.

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Directed study of selected problems of health, physical education, and recreation not related to a thesis. Prerequisites: Graduate classification; approval of the instructor.

## Department of History and Government

Professor J. M. Nance,
Professors J. H. Bass, A. B. Nelson; Associate Professors W. E. Benton, J. T. Duncan, C. H. Hall*, H. H. Lang, T. L. Miller; Assistant Professors A. C. Ashcraft, G. E. Bayliss, R. L. Harris, J. C. Roberts, Jr.*, S. I. Roberts, L. C. Taylor, Jr.; Instructors E. R. Arango, E. M. Bennett, P. A. Ford, C. M. Hepburn, H. P. Hinton, M. T. Kyre, Jr., H. M. Monroe, Jr., C. E. Wynes

### GOVERNMENT

**305. Government of the United States and Texas. (3-0). Credit 3. I**

The organization, functions, and nature of the national government; the rights and privileges of citizenship; the immigration and naturalization laws, all as closely related to the constitution as possible, are treated first. A similar treatment is then applied to the government of Texas. Open only to military juniors and seniors in agricultural education and industrial education.

**306. American National Government. (3-0). Credit 3. I, II, S**

The organization, functions, and nature of the national government; the rights, privileges, and obligations of citizenship; immigration and naturalization laws, all as closely related to the constitution of the United States as possible. Prerequisite: Sophomore classification.

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*On leave of absence.

**307. State and Local Government. (3-0). Credit 3. I, II, S**

The nature, organization, and general principles of local government in the United States with especial attention to these forms of government in Texas. Prerequisite: Government 306 or its equivalent. Required as condition to degree of all students who have not had at least three semester hours credit in military training before graduation.

**308. United States Constitutional Development. (3-0). Credit 3. II**

A study of leading decisions of the Supreme Court. The various trends in our constitutional growth since 1789 are treated, as well as the expansion through judicial interpretation of the powers delegated to the national government. Some attention is given to legal terminology and to the composition and functioning of the national judiciary. Required of all pre-law students in three-year pre-law program. Prerequisites: Government 306; History 105.

**310. Comparative Government. (3-0). Credit 3. II**

A survey of major European governments. Stress will be placed upon the parliamentary democracies of Great Britain, France, West Germany, and Italy. The dictatorships of the U.S.S.R. and Spain will also be considered. Governmental background, structure, and operation will receive attention. Prerequisite: Junior classification. (To be offered in 1960-61 and in alternate years thereafter.)

**315. American Political Parties. (3-0). Credit 3. I**

A study of the organization, history, and functions of political parties, and the place they occupy in the operation of national, state, and local governments in the United States. Attention is concentrated on the two major political parties, but some attention is given third party movements. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**320. Elements of Political Thought. (3-0). Credit 3. II**

A study of ancient, medieval, and modern concepts of government as developed by the principal contemporary political writers, and as reflected in political institutions. Prerequisite: Junior classification. (To be offered in 1961-62 and in alternate years thereafter.)

**335. Government and Politics of Latin America. (3-0). Credit 3. I**

The constitutional development, political institutions, and contemporary political problems of the principal Latin American countries, with special emphasis on the present day constitutions and government structure. Prerequisite: Six hours of government. (To be offered in 1961-62 and in alternate years thereafter.)

**436. Municipal Government. (3-0). Credit 3. I**

Designed for students who may enter the municipal service as well as for those who desire only a general knowledge of city government. Urban growth; legal position of cities; forms of government; the mayor, council, city manager, and municipal courts; relation of city to state; the political process; municipal ownership; services; metropolitan problem; special reference to Texas cities. Prerequisite: Government 305 or 306. (To be offered in 1960-61 and in alternate years thereafter.)

## HISTORY

**105. History of the United States. (3-0). Credit 3. I, II S**

English colonization; the Revolution; adoption of the constitution; growth of nationalism; cotton and the slavery problem; war for Southern independence. (See "Requirement in Government and History", page 96.)

**106. History of the United States. (3-0). Credit 3. I, II, S**

Reconstruction; new social and industrial problems; rise of the progressive movement; United States emergence as a world power; World War I; reaction and the New Deal; World War II; contemporary America. Prerequisite: History 105.

**213. History of England. (3-0). Credit 3. I, II**

British, Saxon, and Norman origins; national development; struggles between church and state; crown and nobles; nobles and commons; development of parliament. Required in three-year pre-law program.

**214. History of England. (3-0). Credit 3. I, II**

Agrarian and Industrial Revolutions; relations with Ireland; evolution of democracy; struggles with France and Napoleon; social legislation in the twentieth century; growth of the Empire until World War II. Required in three-year pre-law program. Prerequisite: History 213.

**217. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe in the Middle Ages. A survey of the development of European civilization from the decline of the Roman Empire to the Renaissance. The course is designed to give the student historical perspective as well as a basic historical knowledge of the period. Major topics include the Graeco-Roman heritage, the barbarian migrations, the growth and development of the church, the rise of capitalism, medieval society, and the origin of nationalism in Europe. Required of majors in history.

**218. Development of Europe. (3-0). Credit 3. I, II**

The history of western Europe from the Renaissance to the present. A survey of modern European civilization, dealing especially with the Renaissance and the Reformation, the Age of Reason and the French Revolution, the Napoleonic wars, the growth of nationalism and democracy in the nineteenth century, the causes and consequences of the two world wars and the rise of dictatorship. Required of majors in history. Prerequisite: History 217.

**302. Colonization of North America. (3-0). Credit 3. II** †

Geographic setting; early English, French, Dutch, Swedish discovery, conquest, and settlement, 1497-1763; colonial administration; colonial life; inter-colonial wars. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1960-61 and in alternate years thereafter.)

**313. The Latin-American Nations to 1820. (3-0). Credit 3. I** †

The period when the Americas south of the United States belonged to Spain and Portugal; discovery; colonial system; social and economic aspects; the wars of independence to the founding of the republics. (To be offered in 1960-61 and in alternate years thereafter.)

**314. The Latin-American Republics, 1820 to the Present. (3-0). Credit 3. II** †

The twenty Latin-American republics since 1820; independence and the dictators; rise of the ABC states; Latin-American civilization after a century of independence; relations with Europe and with the United States in Pan-American movement; participation in world affairs. (To be offered in 1960-61 and in alternate years thereafter.)

**315. The United States, 1901 to the Present. (3-0). Credit 3. I, II, S** †

A study of United States history during the twentieth century. Emphasis is placed primarily on the development and application of progressive principles from the "square deal" of the first Roosevelt to include the subsequent "new deal" and "fair deal" of the Roosevelt and Truman administrations; secondary emphasis is on the international relations of the United States as the nation became a world power, moved from isolation to leadership and back, followed by the development of the "good neighbor" policy toward Latin-America and our participation in World War II. The United Nations and problems.

**318. International Developments since 1918. (3-0). Credit 3. I, II, S** †

A general survey of world politics since the close of World War I. Particular attention will be given to the problems and ideologies of the great powers of Europe and to those factors and conditions which explain present political tendencies and policies. Due consideration will also be given to colonial problems in Asia and Africa, the Sino-Japanese question, and the clash of United States-Japanese policies. World War II; the conflict of ideologies.

**325. Trends in American History. (3-0). Credit 3. I, II S**

The sources and development of leading American institutions constituting representative democracy, their influence upon our nation's development and upon the twentieth century world. Course stresses the institutional rather than the chronological and political aspects of the United States, endeavoring to present what has been well styled "The Epic of America." Students who have credit for History 105 or 106 may not receive credit for History 325. Required of all students offering only three semester hours in American history toward the legal requirement for a baccalaureate degree. Prerequisite: Sophomore classification.

**326. History of Texas. (3-0). Credit 3. I, II, S**

A history of Texas from the Spanish period to the present day. Stress will be placed upon the period of Anglo-American settlement, the revolution, the republic, and the development of the modern state. Prerequisite: Sophomore classification.

**331. Medieval Civilization. (3-0). Credit 3. I** †

History of medieval thought ranging from the influence of Plato and Aristotle to the age of Erasmus and Machiavelli. The course outlines the intellectual history of the Middle Ages and includes in broad outline the interests of man in philosophy, science, education, law, and religion. Prerequisite: Six semester hours of history.

**332. Renaissance and Reformation. (3-0). Credit 3. II** †

A study of the fifteenth and sixteenth centuries with emphasis upon the intellectual history of the era. Political ideas, art, and humanism of the Renaissance are stressed. The doctrinal controversy and the beliefs of Luther, Calvin, and Zwingli are emphasized in the Reformation. Prerequisite: Six semester hours of history.

**375. Tudor and Stuart England. (3-0). Credit 3. I, S**

Study of the changes in the social, economic, and religious organization of England from 1485 to 1689; developments in the international position of England; the rise of Puritanism; the conflict between crown and Parliament; the Interregnum, Restoration, and "Glorious Revolution." Prerequisites: Twelve hours in history, including History 213, 214 or History 217, 218.

**411. The Old South. (3-0). Credit 3. I, S** †

A history of the antebellum South. Emphasis will be placed on the following topics: physical bases of Southern regionalism; Southern alignments on national issues; the slavery-plantation economy and society of the Old South; secession and formation of the Confederacy. Prerequisite: History 106 or 325.

**412. Civil War and Reconstruction. (3-0). Credit 3. II** †

Survey of the background and causes of the war; military, political, economic, and diplomatic aspects of the war; life behind the lines; reconstruction and post-war adjustments, 1861-1877. Prerequisite: Twelve hours of history, or six hours of history and six hours in sophomore courses in other social sciences. (To be offered in 1960-61 and in alternate years thereafter.)

**415. The Institutional Background of Texas, 1519-1845. (3-0). Credit 3. I, S** †

A study of the history of Texas from the Spanish period to annexation to the United States. Particular stress is placed upon the Spanish legal and administrative system. The Mexican administrative system, the establishment of Anglo-Americans in Texas, the revolution, the republic, and the fight for annexation. In each of these topics emphasis is placed upon principles and developments of this period which are reflected in the state's present-day society. (To be offered in 1961-62 and in alternate years thereafter.)

**416. Texas Since 1845. (3-0). Credit 3. II, S** †

A history of Texas since annexation. Careful attention is given to social, cultural, economic, and political developments, and to the place of Texas in national affairs. (To be offered in 1961-62 and in alternate years thereafter.)

**421. Far East, 1895 to Present. (3-0). Credit 3. II** †

Brief survey of the government, politics, and civilizations of China, Japan, India, Pakistan, and Southeast Asia; the political picture in the Far East at the end of the Sino-Japanese War, 1895; spheres of influence; Boxer Rebellion; colonialism and nationalism; rise of republicanism; Far East in two world wars; international developments in the Far East; Korean War. Prerequisite: Twelve hours of history, or six hours of history and at least six hours of sophomore courses in other social sciences. (To be offered in 1961-62 and in alternate years thereafter.)

**422. International Rivalry in the Gulf-Caribbean Area, 1840 to the Present. (3-0). Credit 3. I** †

Background of Spanish colonial policy, with British, French, and Dutch intrusion; conflict of interests; influence of islands on mainland settlement. Early United States interest; Monroe Doctrine and its extension; vital treaties with Colombia and Great Britain. European interests in the islands, Central America, Mexico, and Venezuela. Later policies of the United States, rise of Pan-Americanism and Pan-Hispanism. First reciprocal trade treaties and rise of United States imperialism. Policy of "the good neighbor" under Wilson and Roosevelt. Recent progress of Pan-Americanism toward western hemisphere solidarity. (To be offered in 1961-62 and in alternate years thereafter.)

**423. American Foreign Relations. (3-0). Credit 3. I, S** †

The history of the United States foreign relations and development of our leading foreign policies to 1868. The Revolution and alliance with France; the development of isolation and neutrality; neutral rights and the War of 1812; nationalism and the Monroe Doctrine; Manifest Destiny and its consequences; diplomacy of the Civil War; the Monroe Doctrine applied to France in Mexico; the "Alabama" claims arbitration. (To be offered in 1960-61 and in alternate years thereafter.)

**424. American Foreign Relations. (3-0). Credit 3. II, S** †

The history of the United States foreign relations and development of our leading foreign policies, 1875 to the present; America becomes a world power; imperialism; World War I and the failure of neutrality; the League of Nations and its desertion; Pan-Americanism; failure of disarmament and rise of aggression; neutrality fails again; World War II; United Nations and problems. (To be offered in 1960-61 and in alternate years thereafter.)

## FOR GRADUATES

**607. The United States, 1763-1800. (3-0). Credit 3. I**

A study of the causes of the American Revolution, the Revolution, the Articles of Confederation, and final union under the Constitution. Careful attention will be given economic and social developments as well as political developments. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1960-61 and in alternate years thereafter.)

**609. American Historical Writing. (3-0). Credit 3. I, S**

A survey of American historical writing and historiography from 1607 to the present, with some attention to bibliographical guides to sources and literature of the United States. Prerequisites: Twelve hours of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**610. The Trans-Mississippi West. (3-0). Credit 3. II**

A study of the West in American history. The course will emphasize political, economic, social, and cultural influences of the frontier. Extensive reading will be required. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1960-61 and in alternate years thereafter.)

**611. American Leaders. (3-0). Credit 3. II, S**

The personalities and contributions of thirty-six American leaders from Samuel Adams to Dwight Eisenhower. Prerequisites: Twelve house of advanced history; or 18 hours of history, 6 of which must be advanced, and 6 hours of advanced courses in other social sciences; graduate classification.

**612. The French Revolution and Napoleon. (3-0). Credit 3. II**

Detailed consideration of the decline of the ancient regime, the influence of the Encyclopedists, the causes and course of events during the revolution; and a study of the Napoleonic Era. Critical evaluation of the source material as well as interpretation of the historical importance of the period is stressed. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**615. Growth of Spanish Institutions in America, 1492-1857. (3-0). Credit 3. I**

A study of the growth of political, economic, religious, miiltary, and related institutions, both in theory and in practice, as proposed, developed, and applied in the Spanish-American colonies and nations, 1492-1857. Prerequisites: Eighteen hours of history and government; graduate classification. (To be offered in 1961-62 and in alternate years thereafter.)

**685. Problems. Credit 1 to 3 each semester. I, II, S**

Individual instruction in selected fields of history. The course will stress reports and wide reading in the field selected. Prerequisites: Eighteen hours of history and government; graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Thesis research. Credit will be given only upon acceptance of completed thesis. Prerequisites: Twelve hours of advanced history; graduate classification.

## Department of Horticulture

Professor F. R. Brison,
Professor H. T. Blackhurst; Associate Professors E. E. Burns, H. C. Mohr;
Assistant Professor J. B. Storey

**201. General Horticulture. (2-2). Credit 3. I, II**

A survey of the general field of horticulture; the growth and fruiting habits of horticultural plants; a study of the principles and practices of propagation, including seedage, cuttage, graftage, and special methods; a study of the planting, care, culture, harvesting, handling, and utilization of fruit and vegetable crops. Prerequisite: Biology 101.

**311. Processing Horticultural Crops. (2-3). Credit 3. I** †

A study of the principles and practices of canning, quick freezing, dehydration, pickling, and juice manufacture of fruits and vegetables. Fundamental concepts of the various techniques of preparation, processing, packaging, and use of additives will be given. Field trips to commercial processing plants will be made.

**319. Orchard Management. (2-2). Credit 3. II**

Study of orchard practices including soils and sites, planting, cultivation, pruning, spraying, harvesting, temperature relations, water relations, and selection of varieties. Prerequisite: Horticulture 201.

**322. Vegetable Crops Management. (2-3). Credit 3. I**

The principles of vegetable crop production will be covered. The factors of climate, soil, crop rotation, variety, plant growing, transplanting, planting, irrigation and drainage, weed control, insect and disease control, harvesting, marketing, storage, and special cultural practices will be considered. All of the major vegetable crops will be discussed with reference to these factors.

**418. Nut Culture. (1-3). Credit 2. II** †

Importance of nut crops, emphasis on pecan; problems of developing and maintaining pecan groves; developing native trees; study of varieties, fruit setting, soils, fertilizers, propagation methods, harvesting, handling, shelling, storage, and marketing the crop. Practice: Budding and grafting nursery stock, topworking native trees, storage and handling of budwood, examination of soils, spray application, visits to shelling plants.

**422. Citrus and Subtropical Fruits. (2-2). Credit 3. I** †

A study of subtropical fruits, with attention to citrus fruits, figs, olives, avocados, and dates. Practice: Study of varieties of subtropical fruits and their products; propagation and care of the various subtropical fruits.

**426. Commercial Propagation. (2-2). Credit 3. II** †

A study of principles and practices followed in the propagation of fruit trees. The course includes a study of graft union, congeniality between stocks and scions, adaptation of stocks to environment, and commercial propagation practices for important fruits. Practice includes special treatments for seeds, budding, grafting, and transplanting for important fruits.

**434. Grading and Packing Vegetables. (2-3). Credit 3. I** †

A consideration of the factors of good quality in market vegetables. Standard grades and packages. Shipping methods. The relation of production methods to quality. Transit losses. The methods of marketing open to the producer. Recent trends in marketing and packaging.

**444. Laboratory Examination of Processed Food. (1-3). Credit 2. II** †

Practice and theory in chemical, physical, microscopic, and microbiological methods of food analysis and interpretation of results. Federal and State regulations will be considered. Prerequisite: Approval of the instructor.

**446. Commercial Fruit and Vegetable Canning. (2-3). Credit 3. II** †

An advanced course in pilot plant and laboratory operations pertaining to the production of canned fruits and vegetables. Prerequisite: Horticulture 311.

**481. Seminar. (1-0). Credit 1 each semester. I, II** †

Review of current experimental work in the field of horticulture, presented by staff members, graduate and senior students. Required of all graduate and senior students in horticulture.

**485. Problems in Horticulture. Credit 1 to 4. I, II, S**

Special problems in fruit and vegetable crop production and processing. Prerequisite: Senior classification or approval of Head of Department.

### FOR GRADUATES

**601. Environmental Relations of Fruit Plants. (3-3). Credit 4. I**

Water, soil, and temperature relations of fruit plants, and their modification by management practices will receive primary consideration. Specific problems of management will be studied under field conditions.

**602. Factors Influencing Fruit Production. (3-3). Credit 4. II**

Responses of the principal fruit plants to pruning, differentiation of fruit buds, and internal and external factors influencing fruit setting will be considered in detail. The influence of growth regulators on fruit plants will receive special attention. Field and laboratory studies of important problems will receive considerable attention.

**603. Structure of Vegetable Plants. (3-3). Credit 4. II**

A consideration of the morphological and anatomical features of important families of vegetable plants and the relation of these features to growing practices and progressive improvements of the various plants.

**604. Physiology of Vegetable Plants. (3-3). Credit 4. I**

The topics of thermoperiodism, photoperiodism, nutrient deficiencies, water relations, temperature relations, fruit setting, growth, and seed germination will be taken up for each of the major vegetable crops. The recent developments in the use of hormones and selective herbicides in vegetable production will be discussed.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A comprehensive review of fundamental principles in research and methods employed in research. Practice in the various techniques which may be used in different investigations of horticultural problems.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in horticultural problems for thesis or dissertation.

## Department of Industrial Education

Professor C. H. Groneman,
Professor L. V. Hawkins; Associate Professor L. B. Hardeman; Assistant Professors C. A. Bertrand, J. L. Boone, Jr., L. V. Patterson

**105. Woodcraft. (1-5). Credit 3. I, II**

A comprehensive study of woods, wood products, and wood industries; including growth and botanical structure, production and uses, design, construction, and finishing.

**106. Sheet Metal. (1-5). Credit 3. II**

A study of industrial practices in developing, laying-out, and fabricating sheet metal products. Problems involving parallel-line, radial-line, and triangulation will be provided.

**107. Industrial Materials and Manufacturing Processes. (2-3). Credit 3. I, II**

A study including the processing of woods, metals, fuels, ceramics, and plastics; the fabrication of products from these materials; concepts of accepted manufacturing processes. Laboratory work will consist of problems involving experimentation.

**204. Development and Practice in Industrial Education. (3-0). Credit 3. II**

The history and development of industrial education, its meanings and objectives. Applications of vocational preparation for industry, vocational practices, and developments within industry.

**205. Ornamental Iron. (1-5). Credit 3. I**

A study of metals and metal products; including the alloying and proper use of iron, steel, aluminum, copper, brass, and bronze. Problems involving casting, spinning, machining, forging, welding, tubular construction, and electroplating are required.

**301. Methods of Teaching and Class Management. (2-0) or (3-0). Credit 2 or 3. I**

An introduction to the fundamentals of teaching as applied to industrial subjects; the management of the class, equipment, and supplies.

**304. Applied Industrial Electricity. (2-3). Credit 3. I, II**

A theoretical and practical study of electrical circuits, motors, generators, transformers, lighting, controls, and instruments. Laboratory experiences consist of experiments and projects in circuits and machines. Prerequisite: Physics 202.

**308. A Study of Modern Industries. (3-0). Credit 3. I**

The political, historical, and geographical factors which have a direct influence upon the development and distribution of industries. Specific studies of individual industries are made, such as iron and steel, paper, automobiles, petroleum, cement, leather, plastics, and textiles. Essential features of these industries are considered: location, machinery, power, raw material, market, labor.

**310. Course Making. (2-0). Credit 2. II**

Methods of outlining courses of study to meet the needs of the different types of classes. Each student will make a complete course for some particular subject.

**323. Methods of Teaching Mechanical Drawing. (1-3). Credit 2. I**

The student should have completed courses equivalent to Engineering Graphics 105, 106 before attempting this course. Analysis of problems and the selection of instructional material and methods of presentation for general drafting.

**326. General Metalwork. (1-5). Credit 3. I, II**

The designing and construction of power machinery including the development of plans for procedure, jigs, and fixtures. A study is made of materials and industrial processes and procedures of the foundry, welding, and machine shop. Prerequisites: Mechanical Engineering 202, 310.

**327. Industrial Arts Handcraft. (1-5). Credit 3. I**

Development and preparation of instructional materials; designing and building of teaching type projects and problems in plastics, leather, bookbinding, and other related handcraft activities. Prerequisite: Nine hours of industrial laboratory courses.

**328. Industrial Accident Prevention. (3-0). Credit 3. I, II**

Analysis of fundamentals of accident prevention and their application to industrial supervision and management. Prerequisite: Junior classification.

**332. Plastics and Ceramics. (1-3). Credit 2. I**

Sources, manufacture, supply, and uses of plastics and ceramic materials; designs appropriate for plastics projects; essential processes in fabrication of plastics and ceramic objects.

**334. Upholstery. (1-3). Credit 2. II**

Instruction in the essentials of upholstery processes, including the construction of frames and foundations with and without springs. Prerequisite: Industrial Education 105.

**336. Design in the Arts and Crafts. (1-3). Credit 2. II**

Analysis and solution of design problems applicable to the arts and crafts. Experiences are provided for the designing of industrial products related to industrial arts through the use of common presentation media, proportion, balance, and harmony. Prerequisites: Engineering Graphics 105, 127; Industrial Education 105; Mechanical Engineering 106, 201, 202, 309.

**404. Visual Aids for Industrial Subjects. (1-2). Credit 2. I** †

This course is designed to develop an understanding of, need for, construction of, and use of visual aids for instruction in industrial subjects. Student activity consists of determining values of color in aids, use of projection equipment, mock-ups, posters, and blackboard illustrations.

**406. Industrial Guidance. (2-0). Credit 2. I** †

A study of the instruments and techniques of industrial guidance, its relation to education and industry, its meaning and purpose, and the analysis of methods of investigation and guidance procedures.

**409. Methods of Introducing Industrial Organization and Management into Industrial Schools. (2-0). Credit 2. S** †

The management of modern industrial enterprises and the possible adaptation to industrial schools.

**419. Laboratory of Industries Methods. (1-3). Credit 2. II** †

The student will make a study of the units of industries as generally recommended for public school industrial arts and will select, plan, and design problems and projects to meet these requirements.

**420. Follow-Up, Visitations, and Coordination in Part-Time Schools. (2-0). Credit 2. S** †

Selecting occupations suitable for young people to learn, placing students in suitable employment on a part-time basis, and coordinating their school duties with their work activities.

**423. Analysis Procedure. (1-2). Credit 2. I, II** †

Analysis is made of occupations to obtain content for instructional information. Jobs and operations are studied to determine the order and content of operation, job description, job evaluation, and job safety.

**424. Organization of Instructional Material. (1-2). Credit 2. S** †

A study will be made of published material available in the student's occupational field. Those parts found suitable for vocational classes will be indexed and organized for class use. Types of instruction sheets found necessary for efficient teaching will be written.

**427. Driver Education. (1-6). Credit 3. II**

A study and the application of state and federal regulations and policies governing the efficient and safe operation of automotive vehicles in traffic.

**429. Foremanship and Supervision. (3-0). Credit 3. I**

Positions of supervisory responsibility in an industrial organization, relation of supervisor to the supervised and supervisors; and procedures for meeting the responsibilities of the positions. Prerequisite: Senior classification.

**438. Industrial Safety. (2-3). Credit 3. II**

Continuation of Industrial Education 328. This course will include analyses of various types of accident prevention; organizations and programs in industry including detail study of typical safety departments; control of environmental hazards including inspections, investigations, mechanical guarding, maintenance, and the application of safety engineering principles in design and specifications. Prerequisites: Industrial Education 328; Industrial Engineering 302; and either Industrial Education 429 or Industrial Engineering 401 or registration therein.

**442. Supervised Teaching in Industrial Arts. (2-12). Credit 6. I, II**

Observation of, and participation in, the activities of a typical industrial arts classroom. The student will prepare lesson plans and present demonstrations to pupils in industrial arts in the public schools of Bryan and College Station. Prerequisites: Industrial Education 204, 301; senior classification.

**444. Industrial Distribution. (3-0). Credit 3. I, II**

A seminar approach to the study of the problems of industrial distribution with the assistance of representatives from the Southern Association of Distributors. Prerequisite: Junior classification.

**447. Electricity and Electronics. (2-3). Credit 3. I, II**

A continuation of Industrial Education 304. Laboratory experiences in the construction and operation of electronic devices, including power supplies, receivers, amplifiers, and electronic controls. Prerequisites: Industrial Education 304; Physics 202.

**481. Seminar in Industrial Education. (1-0). Credit 1. I, II**

General discussion of laws, legislation, certification, professional ethics, and other current problems relating to industrial and teaching fields. Prerequisite: Senior classification.

## FOR GRADUATES

**601. History of Industrial Education. (2-0). Credit 2. I, II, S**

A study of leaders, movements, and agencies with special emphasis on the economic, social, and philosophical factors which have contributed to the development of industrial education in the United States.

**602. Industrial Arts Administration and Supervision. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of industrial arts.

**603. Administration and Supervision of Vocational Industrial Education. (2-0). Credit 2. I, II, S**

Problems of the local director or supervisor of vocational industrial education.

**604. Industrial Programs for Junior Colleges and Technical Schools. (2-0). Credit 2. I, II, S**

A study of the kinds, purpose, size, accreditation, growth, and teaching problems in the junior colleges, technical institutes, and adult schools, with particular emphasis on organization and presentation of industrial subject material in these schools.

**605. Problems in Industrial Safety. (2-0). Credit 2. I, II, S**

Basic reasons for accidents; prevention of industrial accidents; qualifications and duties of safety consultants; methods of making investigations; making investigations and how to prepare safety reports.

**606. Organization of Industrial Arts Department. (2-0). Credit 2. I, II, S**

Problems in determining the type and size of industrial arts programs for the various types and sizes of schools with plans for the organization of each.

**609. Methods of Teaching High School Drawing. (2-3). Credit 3. I, II, S**

A survey of the field of drawing. The designing and organizing of problems and teaching devices.

**614. Guidance Seminar. (2-0). Credit 2. I, II, S**

The organization of occupational information; educational and vocational guidance; counseling case problems. Prerequisite: Industrial Education 406 or equivalent.

**616. Methods of Teaching Industrial Arts in Secondary Schools. (2-0). Credit 2. I, II, S**

Selecting and organizing instructional material for problems in a particular industrial activity.

**618. Tests and Measurements in Industrial Education. (2-0). Credit 2. I, II, S**

A study of testing and measuring devices and their application to industrial education subjects.

**619. Related Subjects in Part-Time Cooperative Programs. (2-0). Credit 2. I, II, S**

The organization and presentation of content material necessary in part-time cooperative programs, and the direction of the study of the students engaged in such programs.

**621. Philosophy of Vocational Education. (2-0). Credit 2. I, II, S**

The basic principles involved in the development and operation of industrial education programs under the State and Federal vocational laws.

**622. Philosophy of Industrial Arts Education. (2-0). Credit 2. I, II, S**

The principles involved in the development and operation of industrial arts courses and their purpose and function in the field of general education.

**623. Vocational Guidance Procedures. (3-0). Credit 3. I, II, S**

A workshop approach to the study of vocational guidance, programs, relationships, group techniques, and methodology of the clinical approach.

**626. Classroom Management and Shop Organization. (2-0). Credit 2. I, II, S**

The organization of routine procedures to facilitate teaching; setting up roll-checking devices, issuing procedures for tools and materials, keeping material inventory, using assignment charts and progress charts, using student leadership in routine non-teaching class and shop routine, and keeping records.

**627. Teacher Training for Local Supervisors of Trade and Industrial Classes. (2-0). Credit 2. I, II, S**

A course for local supervisors of industrial education programs or individuals responsible for conducting teacher training and upgrading programs on the local level. Methods for organizing and conducting teacher improvement programs, preparation and correlation of instructional material.

**628. Organization of Vocational Industrial Schools and Classes. (2-0). Credit 2. I, II, S**

Methods of making surveys, determining possible vocational education programs to meet the needs of different types of communities and the proper organization for these classes under the State plan for vocational education.

**630. Auto Mechanics. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to the economic selection, operation, and maintenance of the automobile.

**631. Electricity. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to practical theories and their application to electrical units within a high school program.

**632. Cabinet Making. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern methods of kiln drying, veneer construction, upholstery, and fabrication within the furniture industry.

**633. Machine Shop. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to modern practices and problems in the teaching of advanced machine shop.

**634. Ornamental Metal Work. (1-4). Credit 2. I, II, S**

Development and preparation of instructional materials and the testing of laboratory problems pertaining to mild steel and tubular metal.

**681. Seminar. (1-0). Credit 1. I, II S**

General discussions of laws, legislation, certification, professional ethics, and other current problems relating to the industrial education teaching profession.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed to enable graduate majors to undertake and complete with credit limited investigations which do not fall within the thesis research and which are not covered by any other course.

**691. Research. Credit 1 to 4 each semester. I, II, S**

Research for thesis. Topic subject to approval of the Head of the Department.

## Department of Industrial Engineering

Professor A. R. Burgess,
Professors J. P. CoVan, S. A. Wykes; Associate Professor R. L. Smith, Jr.;
Assistant Professor J. D. Ramsey

**202. Introduction to Industrial Engineering. (2-0). Credit 2. II**

The place of industrial engineering in the factory organization. Relationship of industrial engineering to management, purchasing, cost control, inspection, product development, and maintenance. Historical origins and development of the profession.

**302. Production Engineering. (1-2). Credit 2. I, II**

A coordinated study of manufacturing processes and equipment; operation sequence planning; economic aspects of equipment selection. Tooling and processing a product from product design to final assembly for quantity production. Emphasis is placed on latest developments in manufacturing techniques. Prerequisites: Mechanical Engineering 201, 310.

**401. Survey of Industrial Engineering. (3-0). Credit 3. I, II, S** †

A survey of the industrial engineering field; administrative decisions, layout of equipment, materials handling, production control, quality control, motion and time study, cost determination, wage plans, job evaluations, operations research, use of computers by management. Prerequisite: Junior classification in engineering or business administration, or approval of Head of Department.

**403. Production Management. (3-0). Credit 3. I, II**

A survey course in the principles of production for business administration majors. Prerequisite: Senior classification in business administration.

**404. Motion and Time Study. (2-3). Credit 3. I, II** †

Standardization of job conditions; methods improvement and motion economy; use of flow process charts and diagrams, micromotion analysis of motion pictures, simo-charts, multiple-activity charts; allowances; rating methods; taking time studies; use of standard data and development of time formulas. Prerequisite: Junior classification in engineering or business administration.

**410. Current Practices in Industrial Engineering. Credit 3. S** †

A study of outstanding applications of industrial engineering principles through direct visit to the plants in the industrial Middle West. Course comprises a three-week tour, with emphasis on discussion with men in industry who have pioneered in new ideas in organization, labor relations, materials handling, incentive plans, production control, quality control, and other important management techniques. Prerequisite: Senior classification in industrial engineering.

**411. Wage and Salary Control. (3-0). Credit 3. II** †

Personnel procedures, methods of hiring employees, wage systems, wage administration, job evaluation, merit rating, salary classification, fringe benefits, direct and hidden labor costs, morale building. Prerequiste: Junior classification in engineering or business administration, or approval of Head of Department.

**412. Labor and Industry. (3-0). Credit 3. I, II** †

A brief review of the history of organized labor; critical study of fundamental Federal and State laws governing labor-management relations; study of current interpretations of labor laws, controversial labor-management issues and their solutions. Prerequisite: Senior classification in engineering or business administration, or approval of Head of Department.

**414. Statistical Control of Quality. (2-3). Credit 3. I** †

The engineering aspects of controlling quality through the use of statistical methods. Frequency distributions, control charts for variables, control for fraction defective and defects per unit. Sampling inspection plans. Design of specifications; tolerance systems and gaging. Administration of inspection. Prerequisite: Junior classification in engineering.

**415. Production Control. (1-3). Credit 2. I** †

The planning and control of production; operation analysis; routing; scheduling; dispatching; use of visual production charts and boards; inventory control; accumulation of material requirements; design of production control forms; forecasting production requirements; economic lot size; controls for job order, repetitive cycle, and straight line production. Prerequisite: Industrial Engineering 302, registration in 404.

**416. Factory Layout. (1-6). Credit 3. II** †

The layout of a complete factory for a selected product. Use of machine templates and models; design of materials handling systems; machine erection; auxiliary services; design of storerooms; loading docks; choice of building types; machine selection; estimate of unit costs; estimate of capital requirements; personnel organization; safety considerations in plant layout. Prerequisites: Industrial Engineering 404, 415.

**420. Manufacturing Costs. (3-0). Credit 3. II** †

The study of modern techniques used by engineers for controlling manufacturing costs. Computing probable returns from investments in new plants and new equipment. Use of break-even charts, profit graphs, machine replacement studies, comparison of alternative methods, standard costs, and budgeting, to control manufacturing costs. Introduction to operations research. Prerequisite: Industrial Engineering 414 or registration therein.

**453. Tool Engineering. (2-3). Credit 3. I**

Principles of selection and design of tools, jigs, fixtures, and gages. Economic considerations in the choice of tooling methods. Estimating tooling costs. Dimensioning and tolerances. Methods of locating, clamping, and feeding. Principles of automation. Graphical solution of tool design problems. Numerical control of machine tools. Prerequisites: Civil Engineering 305; Industrial Engineering 203, 302; registration in Mechanical Engineering 337.

**458. Programming of Digital Computers. (3-2). Credit 4. I, II, S** †

Operation of digital computer; flow charts; sub-routines; library programs; floating point; multiple precision; error analysis; optimum coding; symbolic coding; interpretive coding; automatic coding, practical applications. Prerequisite: Senior classification in engineering or physical sciences or approval of the Head of the Department.

**481. Seminar. (0-2). Credit 1. II**

Oral presentation by students of current developments in industrial engineering and management. Technical films on manufacturing operations and economic and social development of the United States. Prerequisite: Junior classification in industrial engineering.

**485. Special Problems in Industrial Engineering. Credit 1 to 3. I, II, S**

A course which permits work on a special project in industrial engineering. Project must be approved by the Head of the Department. Prerequisite: Senior classification in industrial engineering.

## FOR GRADUATES

**601. Industrial Surveys. (2-0). Credit 2. II**

Engineering problems related to industrial investigations, reports on organizations, personnel, capital equipment, financial policies, market, etc. Prerequisites: Industrial Engineering 415, 416.

**603. Human Relations in Industry. (4-0). Credit 4. I**

Causes of misunderstandings between management and labor; interdepartmental relations; conditions which influence the attitudes and productivity of the workers; principles of leadership; critical study of current labor-management problems. Direct worker incentive, seasonal bonuses, quality incentives, profit sharing plans for executives, profit sharing for wage earners. Prerequisites: Industrial Engineering 404, 412.

**604. Advanced Time and Motion Studies. (1-6). Credit 3. I**

Advanced methods in time and motion study; balancing operations in a group or assembly line; learning curves; work sampling; memomotion and chronocyclegraph studies; fatigue effects; determination and application of elemental time data; statistical methods in time study. Prerequisite: Industrial Engineering 404 or the equivalent in practical time study experience in industry.

**608. Industrial Case Analysis. (3-0). Credit 3. II**

Practice in the application of principles to the solution of actual case problems involving broad management decisions. Special attention is given to problems indigenous to Texas industry. Prerequisite: Graduate classification in industrial engineering or approval of Head of Department.

**614. Advanced Quality Control. (3-3). Credit 4. I**

Advanced statistical methods applied to quality control problems; significance tests; correlation analysis; sequential sampling; analysis of variance; design of engineering experiments; response surface techniques. Prerequisite: Industrial Engineering 414.

**615. Production and Inventory Control. (3-3). Credit 4. II**

Recent developments in the techniques used to control inventories and production by means of statistical analysis of the problems, simulation techniques, and mechanized execution of the inventory and production control functions. Prerequisites: Industrial Engineering 415; graduate classification in industrial engineering or approval of Head of Department.

**620. Principles of Operation Analysis. (4-0). Credit 4. II**

Use of mathematical models in making decisions; optimizing over-all policies; probability methods, linear programming; transportation models; queing theory; learning curves; information theory; Monte Carlo methods; use of high speed computers for managerial control. Prerequisites: Industrial Engineering 420, 614.

**621. Computer Methods in Industrial Engineering. (2-3). Credit 3. I**

Principles and applications of computers to the solution of various industrial engineering problems. Prerequisites: Industrial Engineering 458; graduate classification.

**641. Computer Languages. (2-3). Credit 3. I**

A study of design and use of computer oriented and problem oriented languages for digital computers. Prerequisites: Industrial Engineering 458; Mathematics 417.

**642. Computer Methods in Applied Sciences. (2-6). Credit 4. II**

Techniques of analysis and programming required to utilize a stored program digital computer for solution of some typical physical systems. Prerequisites: Industrial Engineering 458; Mathematics 609.

**643. Logic of Information Processing. (2-6). Credit 4. II**

Principles and application of digital computers to problems of data reduction, information retrieval, and large scale commercial data processing problem. Prerequisite: Industrial Engineering 641.

**651. Tool Design. (3-3). Credit 4. II**

Design of automatic machine tools; tracer and director control of tool paths; automatic feeding, holding, indexing and ejection of work pieces; tool replacement analysis. Study of cutting forces, workpiece and fixture distortion. Automatic inspection and sorting, assembly, and packaging. Prerequisite: Industrial Engineering 453.

**681. Seminar. (2-0). Credit 2. II**

Group study and discussion of current developments in industrial engineering practices as reported in the literature and as presented by representatives from industry. Prerequisite: Graduate classification in industrial engineering.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Investigation of special topics not within the scope of thesis research and not covered by other formal courses. Prerequisite: Graduate classification in industrial engineering.

**691. Research. Credit 1 or more each semester. I, II, S**

Research in the industrial engineering field; subject to meet the needs of the individual student.

## Department of Journalism

Professor D. D. Burchard;
Assistant Professors W. D. Calvert, J. E. Redden; Instructor P. D. Gougler

**201. News Writing. (2-3). Credit 3. I**

Beginner's reporting; study of types of news; leads; body treatment of story; feature in lead; facts; background and practice in writing straight news story. Prerequisite: Knowledge of typing.

**202. Beginning News Reporting. (2-3). Credit 3. II**

Study of news sources; style; interviewing; news analysis and discussion; handling of various types of news; emphasis on clear writing; practical reporting experience. Prerequisite: Journalism 201.

**205. Principles of Typography. (2-3). Credit 3. I**

Effective use of type, printing equipment, materials and processes for advertising; editorial and commercial printing production; brief history of printing; understanding of illustrations through engravings and stereotype plates; proofreading; copy-fitting; fundamentals of layout and makeup for publications. Prerequisite: Approval of instructor.

**300. Summer Practice. Ten weeks; required; no credit. S**

Summer practice in newspaper, magazine, or other communications office, as approved by the Department Head. Required previous to registration for fourth year. Prerequisite: Junior classification.

**304. Feature Story Writing. (2-2). Credit 3. I**

The writing of magazine and feature stories; types of feature articles; sources; titles; markets; slanting articles for particular markets; style, word usage; beginnings, illustrations.

**306. Newspaper Production and Management. (2-2). Credit 3. II**

The business of managing a newspaper; the community newspaper; study of the weekly and small town daily newspaper as a service organization; social responsibilities; influence of the community; mechanics of printing; managership; business side of conducting a paper. Prerequisites: Journalism 202, 205.

**307. News Editing. (2-3). Credit 3. I**

The editing of news; intensive training in publication style, news evaluation, copy reading mechanics and techniques, headline writing and proofreading; provides understanding of journalistic responsibilities, ethics, laws of communication and the need for accuracy. Prerequisites: Journalism 202, 205.

**308. Newspaper Advertising. (2-3). Credit 3. II**

Advertising layout and copy for newspapers and other publications; intensive practice in newspaper layouts; writing of retail copy; servicing of newspaper accounts. Prerequisite: Approval of instructor.

**309. Advertising Copy, Layout and Production. (2-3). Credit 3. II**

Application of tested advertising methods to the preparation of merchandising copy; layout design; and production of publication advertising. Sales appeals; attention factors, layout planning, illustrations, copy writing, copy testing, and production methods and problems. Prerequisites: Journalism 205, 308.

**311. Radio and Television News Writing. (2-2). Credit 3. II, S**

Study and analysis of basic methods of writing for radio and television; special emphasis on techniques required in processing news copy; pictures and film. Thorough groundwork in fundamentals of radio and television news style; guidance in newsroom operation, getting the story, filming the news; scripting and editing, and handling equipment.

**315. Photography. (1-3). Credit 2. I, II, S**

Fundamentals of photographic theory and practice; cameras, lenses and shutters; light meters; properties of photographic film and paper; exposure and development of the negative; black and white printing processes; use of filters; lighting (natural, flash, and flood). Emphasis on photography as a medium of communication.

**321. Industrial Journalism. (2-2). Credit 3. I, II, S**

A study of the technique of writing technical articles and reporting news related to engineering, industry, science, and other specialized interests; preparation of fact articles for technical and trade journals.

**406. Publicity and Public Relations. (3-0). Credit 3. II** †

Practical analysis of the various fields of publicity and public relations. Students make surveys and perform laboratory work on actual projects. Theory and practice in various aspects of functioning publicity, including news writing, advertising, and radio.

**409. History and Principles of Journalism. (3-0). Credit 3. I**

Development of American journalism from colonial times to the present, projecting the press as an institution against the background of the economic, social, and political history of the nation. Includes ethics of the profession.

**410. Publications Editing and Designing. (1-3). Credit 2. II**

Advanced editing, headline writing, rewriting, and news evaluation for all types of publications; intensive laboratory practice in advanced copyreading, telegraph wire copy editing, story selection, page makeup, picture and feature material editing, editorial supervision and training in planning various publication formats. Prerequisite: Journalism 307.

**412. Editorial Writing. (3-0). Credit 3. II**

The writing of editorials; editorial page; editorial campaigns; what constitutes editorial policy; ethics in editorial writing. Prerequisite: Journalism 304.

**415. Agricultural Journalism. (2-2). Credit 3. I, II, S**

The principles of newspaper writing; especially the preparation of material for agricultural papers and country weeklies; the part a country paper should play in country development; in the laboratory work, opportunity is given for actual writing for newspapers and farm journals. The Information Office of the College and the Information Department of the Extension Service are cooperative in the course.

**462. High School Journalism and Publications. (3-0). Credit 3. S †**

Problems of advising and sponsoring school newspapers and yearbooks; the school publication as a public relations tool; selecting and training the staff; financing school publications; planning content of high school journalism course. Prerequisites: Twelve semester hours of English; approval of Head of Department.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

Research problems related to the communications field. Individual work, fitted to the special needs of the specific student as determined by his interests and aptitude.

## Liberal Arts

**201. Survey of Music Literature. (1-2). Credit 2. I, II, S**

A study of various types and styles of music literature. Lectures supplemented by listening. Music illustrations selected primarily from standard concert repertoire. For the music listener with little or no formal training in music.

**301. Introduction to Philosophy. (3-0). Credit 3. I**

An introduction to the nature of philosophic inquiry; theories of reality and of knowledge; including idealism, naturalism, and pragmatism; the relation of philosophy to religion, science, history, politics, and education. The aim is to stimulate thinking about problems of conduct and to develop principles and methods of passing judgment on current social issues. Prerequisite: Junior classification.

**304. Philosophies of Life. (3-0). Credit 3. II**

A survey including the biographical and historical backgrounds of the philosophies of the major philosophical thinkers from Socrates to Russell, and of their influence upon the thinking of mankind; incidental consideration of the ideals and values involved in moral, religious, esthetic, and scientific points of view.

**311. Use of Library Resources. (0-2). Credit 1. I, II**

A course designed to develop in students skill in the use of library resources at the upper level. Emphasis placed on specialized reference tools. Prerequisites: Completion of sophomore English; junior classification.

## Department of Mathematics

Professor E. C. Klipple,
Professors R. E. Basye, B. W. Brewer, J. T. Hurt, E. R. Keown, H. A. Luther; Associate Professors Dan Hall, J. T. Kent, W. S. McCulley, R. V. McGee, B. C. Moore, S. A. Sims, M. E. Tittle; Assistant Professors K. R. Bailey, J. R. Hillman, F. N. Huggins*, R. R. Lyle, H. D. Perry; Instructors O. L. Baugh, D. D. Davis, C. A. Greathouse, J. E. Harris, L. M. Hovorak, S. M. Kindall, R. A. Knapp, C. B. Moehlman, N. W. Naugle, W. J. B. Oldham, Jr., M. L. Williams

**101. Algebra. (3-0). Credit 3. I, II, S**

Factoring, fractions, linear equations in one unknown, graphs, systems of linear equations, exponents and radicals, quadratic equations.

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*On leave of absence.

**102. Algebra. (3-0). Credit 3. I, II, S**

Quadratic equations, ratio, proportion, variation, progressions, binomial theorem, complex numbers, theory of equations, determinants, partial fractions.

**103. Plane Trigonometry. (3-0). Credit 3. I, II, S**

Definitions of the trigonometric functions, evaluation of the functions of special angles, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, inverse trigonometric functions, trigonometric equations.

**104. Analytic Geometry. (3-0). Credit 3. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, transformation of coordinates, polar coordinates, parametric equations, plane, quadric surfaces. Prerequisite: Mathematics 103.

**110. Survey Course in Mathematics. (3-0). Credit 3. I, II, S**

Functions and graphs, derivatives of polynomials, integrals of polynomials, systems of equations, logarithms, progressions, binomial theorem, compound interest and annuities, permutations and combinations, probability. Prerequisite: Mathematics 102.

**116. Plane Trigonometry and Analytic Geometry. (4-0). Credit 4. I, II**

Trigonometric functions, fundamental relations, solution of right triangles, trigonometric reductions, angular measure, functions of a composite angle, logarithms, solution of oblique triangles, functions and graphs; the straight line, circle, parabola, ellipse, hyperbola, polar coordinates, sketching of surfaces. Prerequisite: Mathematics 102. (For students registered in architecture.)

**120. Analytic Geometry and Calculus. (5-0). Credit 5. I, II, S**

Equation of a locus, locus of an equation, the straight line, circle, parabola, ellipse, hyperbola, variables, functions, limits, derivatives and differentials for polynomials and applications, integration of polynomials and applications, differentiation of algebraic functions. Prerequisites: Mathematics 102, 103. **A student may not receive credit for Mathematics 120 and also for Mathematics 104 or 209.**

**209. Calculus. (3-0). Credit 3. I, II, S**

Variables, functions, and limits. Derivatives and differentials for polynomials and applications. Integration of polynomials and applications. Differentiation of algebraic functions. Prerequisite: Mathematics 104.

**210. Calculus. (3-0). Credit 3. I, II, S**

Differentiation and integration involving transcendental functions together with applications. Improper integrals, approximate integration, indeterminate forms, mean value theorems. Prerequisite: Mathematics 120 or 209.

**223. Differential and Integral Calculus. (4-0). Credit 4. I, II**

Limits, rate of change, the derivative, maxima and minima, differentiation of polynomials; the definite integral; volume, differentiation of implicit functions, special devices for integration, center of gravity, moment of inertia, double integrals. Prerequisite: Mathematics 116. (For students registered in architecture.)

**303. Theory of Equations. (3-0). Credit 3. I, II**

Complex numbers, remainder theorem, factor theorem, synthetic division, nature of roots of equation, ruler and compass construction, solution of cubic and quartic equations, isolation of a root, solution of numerical equations, determinants, matrices, systems of linear equations, symmetric functions, elimination, resultants, discriminants. Prerequisite: Mathematics 210.

**307. Calculus. (3-0). Credit 3. I, II, S** †

Introduction to series, Taylor's series, partial differentiation, elementary differential equations, applications. Prerequisite: Mathematics 210.

**308. Differential Equations. (3-0). Credit 3. I, II, S** †

Fourier series, linear equations, solution by Laplace transforms and by series, applications. Prerequisite: Mathematics 307.

**405. Vector Analysis. (3-0). Credit 3. I, II** †

Elementary operations, vector and scalar products of two vectors, vector and scalar products of three vectors, differentiation of vectors, the differential operators, applications to electrical theory, dynamics, mechanics, and hydrodynamics. Prerequisite: Mathematics 210.

**409. Advanced Calculus. (3-0). Credit 3. I, II, S** †

The concept of a function, limit of a sequence, continuity, theorems on continuous functions, the definite integral, the derivative, mean value theorems, hyperbolic functions, improper integrals. Prerequisite: Mathematics 210.

**410. Advanced Calculus. (3-0). Credit 3. II** †

Theory of plane curves, mechanics of a particle, Taylor's theorem and applications, numerical integration, convergence and divergence of series, power series, periodic functions, Fourier series. Prerequisite: Mathematics 409.

**411. Mathematical Probability. (3-0). Credit 3. I, II** †

Introductory concepts, permutations and combinations, elementary principles of the theory of probability, probability of experiment, distribution functions and continuous variables, averages, curve fitting, applications. Prerequisite: Mathematics 210.

**414. Mathematical Statistics. (3-0). Credit 3. I, II, S** †

History and terminology of statistics, probability theory, discrete and continuous distributions, expected values, moments, sampling, confidence intervals, tests of hypotheses. Prerequisite: Mathematics 210.

**415. Modern Algebra. (3-0). Credit 3. I, S** †

Integers, rational numbers, real numbers, complex numbers. Groups, rings, integral domains, fields. Polynomials over a field. Prerequisite: Mathematics 210.

**417. Numerical Analysis. (3-3). Credit 4. I, II, S** †

Simultaneous linear equations, elementary matrix theory, numerical integration and differentiation, finite differences and applications, numerical solution of differential equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 308 or registration therein.

## FOR GRADUATES

**600. Fundamental Mathematics in Secondary Schools. (3-0). Credit 3. S**

Basic concepts of arithmetic, algebra, geometry, and trigonometry as viewed from the standpoint of higher analysis; famous problems; construction of tables and slide rules; other topics designed to help vitalize the teaching of high school mathematics. Prerequisite: Mathematics 210.

**601. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Surface integrals, line integrals, vector analysis, partial differential equations, elementary complex variables, applications. Prerequisite: Mathematics 308.

**602. Higher Mathematics for Engineers and Physicists. (4-0). Credit 4. I, II, S**

Fourier integrals, Bessel and Legendre functions, Laplace's equation, the diffusion equation, the wave equation, Green's functions. Prerequisite: Mathematics 601.

**606. Theory of Probability. (4-0). Credit 4. II**

Formulae for combinations and arrangements, problems in total and compound probability, expectation, risk, the problem of repeated trials, Stirling's formula, probability integral, theorems in mean value, dispersion, determination of best value, the law of error, the correlation coefficient, curve fitting. Prerequisite: Mathematics 411.

**607. Real Variables. (4-0). Credit 4. I**

Fundamental theory of number sets and point sets, elementary applications to real functions, theory of linear measure. Prerequisite: Mathematics 409.

**608. Real Variables. (4-0). Credit 4. II**

Measurable functions, the Riemann integral, the Lebesgue integral, applications to real functions and series. Prerequisite: Mathematics 607.

**609. Numerical Analysis. (3-3). Credit 4. I**

Linear programming, matrix calculations, theory of errors, Lagrangian interpolation, approximation of functions, acceleration of convergence, Monte Carlo methods, topics in the solution of equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 417.

**610. Numerical Methods in Differential Equations. (3-3). Credit 4. II**

Elementary numerical solutions, analytical foundations, systems of equations, higher order equations, two-point boundary problems, numerical methods for partial differential equations. The laboratory will consist of programming and operating a large digital computer (magnetic drum stored program computer). Prerequisite: Mathematics 417.

**611. Ordinary Differential Equations. (4-0). Credit 4. I**

Definitions, general methods of solving first order differential equations, singular solutions, geometrical applications, trajectories, motions of a particle, special methods for the equation of the first order, linear equations of the second order, the method of successive approximations, systems of ordinary differential equations, interpolation and numerical integration, symbolic methods, numerical solution of differential equations. Prerequisite: Mathematics 308.

**612. Partial Differential Equations. (4-0). Credit 4. II**

General solution of first order partial differential equations, solution of second order equations from physics and mechanics by separation of variables, solution of second order equations by Green's functions. Prerequisite: Mathematics 611 or the equivalent.

**615. Advanced Algebra. (4-0). Credit 4. I**

Polynomials and their most fundamental properties, determinants, linear dependence, linear equations, theorems concerning the rank of a matrix, linear transformations and combinations of matrices, invariants, bilinear forms, quadratic forms, pairs of quadratic forms. Prerequisite: Mathematics 308 or 409.

**616. Advanced Algebra. (4-0). Credit 4. II**

Properties of polynomials, factors and common factors of polynomials in one variable and of binary forms, factors of polynomials in two or more variables, integral rational invariants, symmetric polynomials, elementary divisors, the equivalence and classification of pairs of bilinear forms and collineations, equivalence and classification of pairs of quadratic forms. Prerequisite: Mathematics 615.

**617. Complex Variables. (4-0). Credit 4. I, S**

Fundamental theory of analytic functions, conformal mapping, applications. Prerequisite: Mathematics 601.

**618. Complex Variables. (4-0). Credit 4. II**

The Schwarz-Christoffel theorem, infinite products, meromorphic functions, elliptic functions, special functions, applications. Prerequisite: Mathematics 617.

**620. Fourier Series and Allied Topics. (4-0). Credit 4. I**

Convergence of Fourier series, the cosine series, the sine series, uniform convergence of Fourier series, differentiation and integration of Fourier series, Fourier integrals, Bessel functions. Prerequisite: Mathematics 608.

**622. Laplace Transforms. (4-0). Credit 4. II, S**

Fundamental theorems concerning Laplace transforms. Applications to ordinary and partial differential equations, difference equations, and integral equations. Prerequisite: Mathematics 601.

**623. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. II**

Derivation and solution of the differential equations of chemistry and chemical engineering, mathematical theory of distillation, series solutions of differential equations, Bessel functions. Prerequisite: Mathematics 308.

**624. Higher Mathematics for Chemical Engineers. (4-0). Credit 4. I**

Equations of finite differences, applications of partial differentiation, solution of partial differential equations, Fourier integrals, orthogonal systems, numerical and graphical methods, theory of errors. Prerequisite: Mathematics 623.

**625. Matrix Algebra and Tensor Calculus. (4-0). Credit 4. I, II, S**

Elementary matrix operations; linear transformations; canonical and modified triangular forms of matrices; inverse of a non-singular matrix; diagonal and rotation matrices; characteristic roots of a matrix; symmetric matrices; tensor concept; covariance and contravariance; algebra of tensors; metric tensors; Christoffel's symbols; covariant differentiation of tensors; applications. Prerequisite: Mathematics 405 or 601.

**627. Theory of Numbers. (3-0). Credit 3. I**

Ordered rings; the ring of integers; Euclidean rings; unique factorization; congruences; the Fermat-Euler Theorem; residues of powers; quadratic residues; the Legendre, Jacobi, and Kronecker symbols; quadratic reciprocity; diophantine equations; the series of primes; tests for primality. Prerequisite: Mathematics 409 or 415.

**628. Theory of Numbers. (3-0). Credit 3. II**

Commutative rings; ideals and residue class rings; principal ideal rings; unique factorization rings; quadratic fields; fields of higher degree. Prerequisite: Mathematics 627.

**641, 642. Modern Analysis. (4-0). Credit 4 each semester. I, II**

Recent developments in the theory of functions. Prerequisite: Mathematics 608.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable students to undertake and complete with credit limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Mathematics 601.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation.

## Department of Mechanical Engineering

Professor C. M. Simmang,
Professors C. W. Crawford, N. R. Gay, E. S. Holdredge, L. S. O'Bannon, J. G. H. Thompson, W. I. Truettner, R. M. Wingren; Associate Professors J. H. Caddess, D. W. Fleming, R. H. Fletcher, A. M. Gaddis, R. H. Gibbs, W. S. Guthrie; Assistant Professors O. W. Albritton*, A. B. Alter, R. W. Downard**, E. Logan, Jr.*, T. A. Noyes, J. V. Perry, Jr., P. D. Weiner; Instructors P. M. Beckham, S. E. Brown, R. H. Gibson, E. D. Kranz, J. M. Nash*, T. G. Priddy, H. G. Stallings, C. A. Whitehurst

**101. Engineering Problems. (0-3). Credit 1. I, II**

Use of the slide rule, dimensional equations, solution of problems involving various fields of engineering, trigonometry, and principles of motion. Logical thinking, neatness, and form stressed throughout. Prerequisites: Mathematics 101 or 102, and 103 or 116, or registration therein.

**105. Carpentry and Mill Work. (1-6). Credit 3. I, II**

This course is designed for freshman architectural students and for business administration freshmen taking building products marketing. The course includes simple building constructions such as framing, roof construction, general carpentry work, exterior and interior finishing, forms, working drawings, and mill work including the use of machines, hand tools, safety, and built-in cabinet construction in the home.

**106. Cabinet Making. (1-6). Credit 3. II**

Design, rod making, construction, and finishing of furniture; glues, varnishes, lacquers, and other finishing materials; production methods; care and maintenance of woodworking machinery.

**201. Manufacturing Processes. (0-3). Credit 1. I, II**

Simple pattern layouts and construction of patterns; pattern storage; costs and weights of patterns and castings; kiln-drying and moisture content of pattern woods; the patternmaking industry. Cupolas; gas fired furnaces, moulding sands; core-making; foundry layouts; and practice in moulding and casting both ferrous and non-ferrous metals. Welding materials and equipment, demonstration and practice in Heliarc, Atomic-hydrogen, metallic arc, electrical resistance, oxy-acetylene, and metallizing. Prerequisite: Engineering Graphics 105.

**202. Manufacturing Processes. (0-3). Credit 1. I, II**

A continuation of Mechanical Engineering 201, including advanced methods of patternmaking, moulding, and weld inspection and testing, fundamentals of joint design and metallography. Prerequisite: Mechanical Engineering 201.

**212. Engineering Mechanics. (3-0). Credit 3. I, II, S**

Forces and couples, force systems, resultants, components, equilibrium, frame structures, center of gravity, and moment of inertia. Prerequisites: Mathematics 210 or registration therein; Physics 218.

**220. Engineering Mechanics. (4-0). Credit 4. I**

The principles of mechanics as related to both statics and kinetics. A condensation of the material in Mechanical Engineering 212 and 313. Prerequisites: Mathematics 210 or registration therein; Physics 218.

**309. Machine Production Techniques. (0-3). Credit 1. I, II, S**

Lecture demonstrations and practice in safety, care of machines and hand tools, shop organization, cutting speeds and feeds, standard machine tool work in metals, single point tool grinding, layout, drilling, tapping, shaping, turning, boring, threading, and milling. Prerequisite: Engineering Graphics 105.

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*On leave of absence.
**Retired effective October 31, 1960.

**310. Machine Production Techniques. (0-3). Credit 1. I, II, S**

A continuation of Mechanical Engineering 309. Machining of metals with both standard and production machine tools. Manufacture of interchangeable parts, jigs, fixtures, and fixed gages. Prerequisite: Mechanical Engineering 309.

**313. Engineering Mechanics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 212, including kinematics, both graphical and algebraic solutions of relative linear velocities and accelerations, kinetics, dynamics of translation and rotation, work, energy, impact, momentum, and balancing. Prerequisite: Mechanical Engineering 212.

**323. Thermodynamics. (4-0). Credit 4. I, II, S**

The thermodynamics of ideal gases, including non-flow and steady-flow processes; internal combustion engines; gas compressors; combustion; vapors and vapor mixtures, boilers, and vapor cycles. Prerequisites: Mathematics 210; Physics 219.

**327. Thermodynamics. (3-0). Credit 3. I, II, S**

The thermodynamics of gases, vapors, and liquids in various non-flow and steady-flow processes; internal combustion engines; gas compressors; power plant equipment. Prerequisites: Mathematics 210; Physics 219.

**328. Thermodynamics. (3-0). Credit 3. I, II, S**

A continuation of Mechanical Engineering 327, covering gas mixtures, variable specific heats, turbines, modern power plant cycles, refrigeration, air conditioning, heat transfer. Prerequisite: Mechanical Engineering 323 or 327.

**329. Advanced Cabinet Making. (1-6). Credit 3. II**

Cabinet and furniture design, estimating, detailing, rod making construction and finishing. A major project is to be constructed from a set of drawings and details made by the student. A term paper is required on some related subject, such as design, finishing, safety, production methods, etc. Prerequisite: Mechanical Engineering 105 or 106, or equivalent experience.

**337. Kinematic Drawing. (0-3). Credit 1. I**

Problems and drafting involving linkages, centros, relative linear velocities, cams and gears. Designed especially to supplement the kinematics of motion included in the course of dynamics for industrial engineers. Prerequisite: Mechanical Engineering 313 or registration therein.

**338. Kinematics and Machine Design. (2-3). Credit 3. I, II, S**

A study of instantaneous centers, velocities, accelerations, cams, and an introduction to elementary machine design. Prerequisites: Civil Engineering 305 and Mechanical Engineering 313, or registration therein.

**340. Physical Metallurgy. (2-3). Credit 3. I, II, S** †

The fundamentals of the physical metallurgy of irons, steels, and their alloys; precipitation hardening and corrosion resistance of non-ferrous alloys; laboratory work in polishing, etching, and preparation of specimens, making and studying photomicrographs. Prerequisite: Civil Engineering 305.

**344. Fluid Mechanics. (3-0). Credit 3. I, II, S**

Application of the laws of statics, buoyancy, stability, energy, and momentum to the behavior of ideal and real fluids. A study of dimensional analysis and similitude and their application to flow through ducts and piping, dynamic lift and related problems. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**346. Fluid Mechanics and Heat Transfer. (3-0). Credit 3. II**

The application of mechanics and thermodynamics to the behavior of ideal and real fluids. A study of the fundamental laws relating to heat flow. Prerequisites: Mechanical Engineering 220 or 313, and 323 or 327.

**403. Engineering Laboratory. (1-3). Credit 2. I, II, S**

Study and testing of instruments used in laboratory work and simple tests of engines, pumps, and flow devices. Engineering analysis and analogue theory are stressed. Calculations and written reports on the investigations and results obtained. Prerequisite: Mechanical Engineering 323 or 327.

**404. Engineering Laboratory. (1-3). Credit 2. I, II, S**

A continuation of Mechanical Engineering 403 with more advanced work in the analysis of steam and internal combustion engines, turbines, fans, refrigeration machinery, pumps, and various flow devices. Prerequisites: Mechanical Engineering 328, 344, 403.

**409. Structure and Properties of Alloys. (2-3). Credit 3. I**

This course gives a description of the fundamental properties of alloys. These alloys are the base on which most of present-day technology rests. Prerequisites: Chemistry 102; Mechanical Engineering 340; Physics 220.

**410. Internal Combustion Engines. (3-0). Credit 3. I, II** †

Thermodynamics of cycles for internal combustion engines and gas turbines, including fuels and combustion. Performance characteristics of various types of engines. Prerequisite: Mechanical Engineering 323 or 327.

**414. Steam and Gas Turbines. (3-0). Credit 3. I** †

Analysis of gas turbine cycles, high speed gas flow, turbine and compressor kinematics and thermodynamics; study of steam turbines and of special cycles. Prerequisites: Mechanical Engineering 328, 344.

**417. Power Engineering. (4-0). Credit 4.* I, II, S**

The application, operation, and performance of all types of power plant equipment. The selection and arrangement of such equipment from the standpoint of economics. Prerequisites: Mechanical Engineering 328, 344. Mechanical Engineering 461 also required when course becomes 3 credits.

**420. Marine Engineering. (3-0). Credit 3. II**

Applications of power engineering to ship propulsion and to auxiliary machinery in merchant ships, including steering engines, electric generators, fresh water distillers, refrigeration plants, and devices for safe navigation. Elementary naval architecture, stability of ships under effects of weather, damage control, general aspects of nuclear propulsion plants and small boat engines are considered. Prerequisite: Mechanical Engineering 344 or 346.

**432. Automotive Engineering. (3-0). Credit 3. II**

The modern automobile, its power plant, fuels, performance, vibration, dynamic balancing, electrical equipment, braking systems, construction, etc., from an engineering standpoint. Prerequisites: Mechanical Engineering 313, and 323 or 327.

**436. Air Conditioning and Refrigeration. (3-0). Credit 3. II** †

Application of the principles of thermodynamics to equipment and methods of practical production of refrigeration. The thermodynamics of conditioning air. Selection of equipment, piping, and duct layouts for heating, ventilating, and air conditioning. Prerequisite: Mechanical Engineering 323 for non-mechanical engineering majors; 328 for mechanical engineering majors.

**445. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to various machine parts, such as columns, screws, shafts (considering combined stresses), bearings, brakes, springs, and complete machines. Prerequisites: Mechanical Engineering 310, 338, 340.

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*Becomes (3-0), credit 3, effective February 1, 1962.

**446. Machine Design. (2-3). Credit 3. I, II** †

The theory and practice of machine design applied to problems encountered in transmission of power by means of belts, chains, and gears. Prerequisite: Mechanical Engineering 445 or registration therein.

**457. Engineering Analysis. (3-0). Credit 3. II** †

Mathematical and experimental methods of solving problems in the various fields of engineering. Dimensional analysis, representation and analysis of experimental data, graphical and numerical solution of differential equations, analogies and computers. Prerequisites: Mathematics 308; senior classification in engineering.

**459. Mechanical Vibration. (3-0). Credit 3. I, II** †

The basic theory of vibrating systems with single and multiple degrees of freedom and the principles of transmission and isolation of vibrations. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**461. Heat Transfer. (3-0). Credit 3. I, II** †

Study of conduction, convection, and radiation separately and in combination; steady and unsteady states; mathematical treatments; graphical and numerical solutions, dimensional analysis. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**481. Seminar. (0-2). Credit 1. I, II**

Oral presentation of selected topics from current literature of the field. Technical films showing practical application of theories of engineering and manufacturing processes. Lectures from industrial representatives. Prerequisite: Senior classification.

**482. Seminar. (0-2). Credit 1. II**

A continuation of Mechanical Engineering 481 but with more extensive reports and with lectures from visitors. Prerequisite: Senior classification.

**485. Advanced Problems in Mechanical Engineering. Credit 2 to 5. I, II, S** †

Special problems in the various phases of mechanical engineering are assigned to individual students or to groups. Readings are assigned, and frequently consultations are held. Prerequisites: By permission and senior classification in mechanical engineering.

## FOR GRADUATES

**601. Advanced Machine Design. (4-0). Credit 4. I**

A study of combined stresses and theories of failure, statically indeterminate structures, piping design, flat plates, curved beams, and the theory of lubrication. Prerequisites: Mathematics 308 or registration therein; Mechanical Engineering 445 or the equivalent.

**603. Power Plants. (2-6). Credit 4. II**

The design of central and isolated power plants with special attention to over-all economic operation. Prerequisite: Mechanical Engineering 417.

**605. Engineering Analysis. (4-0). Credit 4. I, S**

A study of analytical, graphical, and approximate methods of solving problems common to engineering; dimensional analysis and model study; design of experiments; statistical analysis and interpretation of test data including derivation of empirical equations. Prerequisite: Mathematics 308 or registration therein.

**613. Engineering Dynamics. (4-0). Credit 4. II**

A study of the dynamics of particles and of rigid bodies; the virtual work principle, Lagrange's and Euler's equations of motion, and Hamilton's principle applied to engineering problems. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**615. Advanced Engineering Thermodynamics. (4-0). Credit 4. I**

The theories of thermodynamics and their application to the more involved problems in engineering practice. Prerequisite: Mechanical Engineering 328.

**616. Heat Transmission. (4-0). Credit 4. II**

The fundamental laws relating to heat flow, the application of these laws to engineering materials used in various industrial processes; a study of recent developments by reference to current literature. Prerequisites: Mathematics 601; Mechanical Engineering 605.

**617. Mechanical Vibrations. (4-0). Credit 4. I**

The theory of vibrations of machines and structures. Prerequisites: Mathematics 308; Mechanical Engineering 313.

**618. Advanced Air Conditioning. (2-6). Credit 4. II**

Thermodynamics of air vapor mixtures applied to problems of air conditioning. Practice in design and selection of equipment with emphasis on the preparation of plans and specifications. Prerequisite: Mechanical Engineering 436.

**619. Theory of Elasticity. (4-0). Credit 4. II**

Applications of the theory of elasticity to machine design. Study of compatability equations, stress functions, energy methods, etc. Prerequisites: Civil Engineering 633 or Mechanical Engineering 601; Mathematics 601 or registration therein.

**620. Experimental Stress Analysis. (3-3). Credit 4. I**

Use of experimental methods in machine design. Study of photoelasticity, electric strain gauges, stresscoat, etc. Prerequisites: Civil Engineering 633 or Mechanical Engineering 601 or registration therein; Mathematics 308 or registration therein.

**621. Fluid Mechanics. (4-0). Credit 4. II**

A study of flow problems encountered in the design of water, gas, and steam turbines; centrifugal and axial-flow pumps and compressors. Prerequisites: Mathematics 308; Mechanical Engineering 344.

**640. Ferrous Metallurgical Design. (3-3). Credit 4. II**

A detailed study of the phase transformations in steel, the resulting changes in mechanical properties, the peculiarities of the steels, and their influence upon the design of machine elements. Prerequisite: Mechanical Engineering 340.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

The content will be adapted to the interest and needs of the group enrolled.

**691. Research. Credit 1 or more each semester. I, II, S**

Methods and practice in mechanical engineering research for thesis or dissertation.

## Department of Military Science and Tactics

Frank L. Elder, Colonel, Infantry, USA
Professor of Military Science and Tactics

### UNITED STATES ARMY

Associate Professors: Lieutenant Colonels L. C. Brown, R. E. Byrns, T. A. Hotchkiss, D. D. McCorvey, H. A. Stuverud; Majors W. R. Haley, Jr., J. H. Irving, Jr., R. M. Peach, L. L. Stevenson; Assistant Professors: Captains J. D. Bennett, O. E. Biggs, D. J. Chandler, S. J. Grant, Jr., W. T. Jessee, W. D. Old, II, W. T. Rife, W. H. Rhodes, J. W. Simmons; Chief Warrant Officer H. A. Plaisance; Instructors: Sergeant Major W. R. Reese; Master Sergeants C. E. Gentry, W. G. Harris, T. I. Hensley, H. G. Latham, A. M. Linton, C. E. McCollum, A. E. Miller, C. A. Pantalion, G. E. Switzer, Jr., T. R. Tewell, K. H. Truitt, J. W. Turnipseed; Sergeants First Class J. R. Brown, J. H. Combs, R. L. Dennis, D. A. Herring, E. V. Hetzel, J. T. Lyons, E. J. McClure, Jr.

### Basic Course of Military Science

**121. First Year Basic Military Science. (0-3). Credit 1. I**
Theoretical: Organization of the Army and ROTC, individual weapons and marksmanship, American military history.

Practical: Leadership, drill, and command; individual weapons and marksmanship.

**122. First Year Basic Military Science. (0-3). Credit 1. II**
A continuation of Military Science 121.

**221. Second Year Basic Military Science. (0-3). Credit 1. I**
Theoretical: Map and aerial photograph reading, United States Army and national security. Introduction to operations and basic tactics.

Practical: Leadership, drill, and command; basic tactics.

**222. Second Year Basic Military Science. (0-3). Credit 1. II**
A continuation of Military Science 221.

### Advanced Course of Military Science

**321. First Year Advanced Military Science. (2-3). Credit 3. I**
Theoretical: Leadership, military teaching methods, branches of the Army, small unit tactics and communication, and pre-camp orientation.

Practical: Leadership, drill, and command; small unit tactics: military teaching methods.

**322. First Year Advanced Military Science. (2-3). Credit 3. II**
A continuation of Military Science 321.

**421. Second Year Advanced Military Science. (2-3). Credit 3. I**
Theoretical: Operation, logistics, Army administration, military law, service orientation, and the role of the United States in world affairs.

Practical: Leadership, drill, and command.

**422. Second Year Advanced Military Science. (2-3). Credit 3. II**
A continuation of Military Science 421.

## Department of Modern Languages

Professor J. J. Woolket,
Professor J. A. Dabbs; Associate Professors E. C. Breitenkamp, T. E.
Comfort, J. M. Skrivanek; Instructors C. E. Evans, M. E. Gottschalk,
M. C. Quinn

Foreign languages, in addition to their unquestioned cultural value, have a utilitarian value of great importance for those expecting to engage in research or purely practical pursuits. It is, therefore, advisable, when possible, for students to take up such a language during their undergraduate studies and thereby have the use of it when they begin advanced work in agriculture, engineering, or in pure science. Otherwise, as often happens, their specialization may be hampered or delayed. A language laboratory is available for those interested in developing a command of the spoken language.

**100. Spoken English for Foreign Students. (3-0). Credit 3. S**

Instruction in American-English pronunciation; intensive class drill; individual laboratory work in comprehension and practice in correct pronunciation by means of tape recordings; study of idiomatic and colloquial expressions; orientation in the American way of life and in university procedure.

**101. Beginning French. (3-0). Credit 3. I**

Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**102. Beginning French. (3-0). Credit 3. II**

Continuation of Modern Language 101 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice. Prerequisite: Modern Language 101 or equivalent.

**103. Beginning German. (3-0). Credit 3. I, II**

Study of standard elementary grammar with emphasis on modern usage; elementary readings begun at mid-semester; early attention given to background for conversation; language laboratory available for collateral training.

**104. Beginning German. (3-0). Credit 3. I, II, S**

Continuation of Modern Language 103 with completion of study of elements of grammar; extensive reading of elementary texts with written and oral exercises designed to develop conversational ability. Oral-aural equipment available for laboratory practice. Prerequisite: Modern Language 103 or equivalent.

**105. Beginning Spanish. (3-0). Credit 3. I, II, S**

For students who have had no previous training in Spanish. Study of standard elementary grammar with oral and reading exercises; early attention given to background for conversation. Part of preparation will be done in language laboratory. On completion of course the student should have a 500-word active vocabulary; he should be capable of simple conversation.

**106. Beginning Spanish. (3-0). Credit 3. I, II, S**

Continuation of Modern Language 105. Extensive reading of easy texts with written and oral exercises and grammar review. Oral exercises designed to develop conversational ability. On completion of the course the student should have an active vocabulary of 900 words and passive vocabulary of about 1300. Part of preparation will be done in language laboratory. Prerequisite: Modern Language 105 or equivalent.

**109. Beginning Russian. (3-0). Credit 3. I**

Study of standard elementary grammar with oral, written, and reading exercises; early attention given to background for conversation. Language laboratory available for collateral training.

**110. Beginning Russian. (3-0). Credit 3. II**

Continuation of Modern Language 109; continued study of elements of grammar; oral exercises designed to develop conversational ability; continued use of oral-aural laboratory equipment. Prerequisite: Modern Language 109 or equivalent.

**201. Intermediate French. (3-0). Credit 3. I**

Introduction to French readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 102 or equivalent.

**202. Intermediate French. (3-0). Credit 3. II**

Continuation of Modern Language 201 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 201 or equivalent.

**203. Intermediate German. (3-0). Credit 3. I**

Introduction to German readings of average difficulty, principally through short stories and selections from longer works. Review of grammar; composition; practice in conversation. Prerequisite: Modern Language 104 or equivalent.

**204. Intermediate German. (3-0). Credit 3. II**

Continuation of Modern Language 203 with increased conversational material. Some scientific selections included in class readings; collateral readings and reports. (Science students may be assigned outside reading in their respective fields if they so request.) Prerequisite: Modern Language 203 or equivalent.

**205. Intermediate Spanish. (3-0). Credit 3. I, II**

Rapid review of Spanish language structure, followed by intensive practice on the 1,500-word level, with emphasis on development of aural comprehension and speaking ability. Supplemental written and oral exercises designed to develop self-expression and recognition ability. Language laboratory available for collateral training. Prerequisite: Modern Language 106 or two years of high school Spanish.

**206. Intermediate Spanish. (3-0). Credit 3. I, II**

Continuation of Modern Language 205. Reading of standard literary works on the 2,000-word level. Extensive written and oral work, translation and original, aimed at fixing correct grammatical usage and ease of self-expression. Partly conducted in Spanish. On completion of the course the student should have the basic ability to understand and speak standard Spanish and, with a dictionary, to read any modern text. Prerequisite: Modern Language 206 or equivalent.

**209. Intermediate Russian. (3-0). Credit 3. I**

Review of grammar; selected readings based on everyday subjects; supplementary material to develop self-expression and recognition ability. Prerequisite: Modern Language 110 or two admission units in Russian.

**210. Intermediate Russian. (3-0). Credit 3. II**

Continuation of Modern Language 209. Readings in technical and literary texts. Prerequisite: Modern Language 210 or equivalent.

**305. Modern Spanish-American Drama. (3-0). Credit 3. I**
A study of representative plays by such Spanish-American dramatists as Florencio Sanchez, Martinez Cuitiño, Bustillo Oro, Rodolfo Usigli, and others. (The dramatists studied will vary depending on their contribution to the Spanish-American theater.) An effort is made to obtain an understanding of the economic, social, and cultural background of the Spanish-American republics. The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**306. Modern Spanish-American Drama. (3-0). Credit 3. II**
Continuation of Modern Language 305. However, the authors and plays studied will differ from those offered in Modern Language 305. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**309. Advanced Russian. (3-0). Credit 3. I**
Reading of selections from Russian literature and technical and scientific publications. Special attention to participial constructions and translation of complex sentences. Conversation practice. Laboratory available for oral preparation, comprehension drill, and vocabulary-building exercises. Prerequisite: Modern Language 210 or approval of Head of Department.

**310. Advanced Russian. (3-0). Credit 3. II**
Continuation of Modern Language 309. Class reading of wide variety of selections from current literary, journalistic, and scientific periodicals. Partly conducted in Russian. Outside reading in selected fields of individual interest. Laboratory available for advanced conversation and comprehension drill. Prerequisite: Modern Language 309 or approval of Head of Department.

**325. Public Speaking in Spanish. (1-2). Credit 2. I**
Training in the preparation and delivery of talks in Spanish. Students are required to prepare and deliver a three-minute talk in Spanish once a week, and to conduct a question-answer period of three minutes on their talk. These talks are based on subjects dealing with the student's professional field and on those dealing with Spanish-America. The talks are recorded, and individual weekly interviews are scheduled for analysis of the recording with reference to pronunciation, diction, and syntax. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**326. Public Speaking in Spanish. (1-2). Credit 2. II**
Continuation of Modern Language 325 with round-table discussions and impromptu speeches. Prerequisite: Completion of any 300 course in Spanish, or approval of Head of Department.

**335. Spanish-American Novel. (3-0). Credit 3. I**
A study of the most important works of some distinguished contemporary Spanish-American novelists. (The list will vary but will be chosen from such writers as Güiraldes, Azuela, Gallegos, Lopez y Fuentes, Guzman, Pietri, etc.) The course is conducted largely in Spanish, and short written reports in Spanish are required as part of the daily assignment. In addition, term papers in Spanish are required on assigned collateral reading. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**336. Spanish-American Novel. (3-0). Credit 3. II**
Continuation of Modern Language 335. However, the authors and novels studied will differ from those offered in Modern Language 335. Prerequisite: Modern Language 206 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**385. Readings in French. Credit 1 or 2. I, II**
Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of French; junior classification; approval of Head of Department.

**386. Readings in German. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Nine hours of German; junior classification; approval of Head of Department.

**388. Readings in Russian. Credit 1 or 2. I, II**

Individual supervision of readings selected for each student separately. There will be written and oral reports and a semester examination; no class meetings. Prerequisites: Twelve hours of Russian; approval of Head of Department.

**401. Introduction to Scientific French. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**402. Readings in Scientific French. (1-2). Credit 2. S**

Continuation of Modern Language 401. The student will select and translate material in his major field written in French. Accuracy and skill are developed through personal conferences and checking the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 401 or approval of the Head of the Department.

**403. Introduction to Scientific German. (3-0). Credit 3. S**

This course is designed to assist the graduate student to prepare himself to read scientific material with sufficient adequacy to pass the foreign language examination requirement for the Doctor of Philosophy degree. Grammar and syntax will be presented by units. Technical vocabulary and translation ability will be developed by the study of sample reading material in the fields of the various sciences.

**404. Readings in Scientific German. (1-2). Credit 2. S**

Continuation of Modern Language 403. The student will select and translate material in his major field written in German. Accuracy and skill are developed through personal conferences and checking of the student's work by the instructor. This course is designed to prepare the student to fulfill the foreign language reading requirement for the Ph.D. degree. Prerequisite: Modern Language 403 or approval of the Head of the Department.

## Department of Nuclear Engineering

Professor R. G. Cochran;
Associate Professor R. A. Oxford; Assistant Professor J. D. Randall;
Instructor J. V. Walker

**401. Nuclear Engineering. (3-0). Credit 3. I** †

A non-rigorous treatment of the various elements of nuclear engineering. This course is especially offered for students not electing to pursue advanced study in this field. Prerequisites: Mathematics 210; Physics 219; senior classification.

**402. Industrial Applications of Radioisotopes. (3-0). Credit 3. II** †

The properties of radioactive nuclei and the interactions of radiation with matter are discussed. The behavior of radiation detection devices is covered. The properties of radioisotopes that lend themselves to industrial usage are presented and the individual applications are evaluated. Prerequisites: Mathematics 308; senior classification.

## FOR GRADUATES

**601. Nuclear Reactor Analysis. (4-0). Credit 4. I**

Nuclear transformations in fission reactors. Neutron cross-sections and resonance reactions. The neutron balance and cycle. Neutron slowing-down and diffusion. Fermi age and multigroup criticality for bare, homogeneous cores. Reflected homogeneous and heterogeneous reactors. Reactor kinetics including the inhour equation, source multiplication in sub-critical reactors and fission product poisoning. Prerequisites: Mathematics 308, 601 or registration therein.

**602. Nuclear Reactor Analysis. (4-0). Credit 4. II**

Introductory transport theory with emphasis on the limitations of diffusion and age theory. Multigroup slowing-down diffusion theory for bare and reflected cores. Thermal utilization, resonance escape, fast fission, homogenization and anisotropies in heterogeneous lattices. Temperature coefficients. Control rods. Reactor kinetics with and without temperature feedback. Perturbation theory for thermal reactors. Prerequisites: Mathematics 601; Nuclear Engineering 601.

**605. Nuclear Measurements Laboratory. (2-3). Credit 3. I**

The basic techniques of nuclear measurements are discussed and practiced. The behavior of neutrons in multiplying and non-multiplying media is observed. Extensive use is made of the nuclear reactor. Prerequisite: Nuclear Engineering 601 or registration therein.

**606. Reactor Experimentation. (2-3). Credit 3. II**

The techniques of Nuclear Engineering 605 are utilized in measuring the properties of a nuclear reactor. Control rod and power calibrations are performed. The effects of scattering, absorption, and moderation on the reactor are determined. The reactor core is disassembled and a critical experiment performed. Prerequisites: Nuclear Engineering 602 or registration therein, 605.

**608. Thermonuclear Engineering. (3-0). Credit 3. II**

Fundamentals relative to the use of the fusion reaction as an energy source. Charged particle reactions. Reaction rates. Radiation losses. Transport theory for ionized gases. Liouville and Boltzmann equations. Macroscopic conservation laws and magnetohydrodynamics. Propagation of small amplitude waves. Instabilities. Confinement and heating problems. Diagnostics.

**609. Radiological Safety. (2-0). Credit 2. I, S**

Lectures and demonstrations concerning the interactions of nuclear radiations with matter and especially with biological systems. Special emphasis will be given to the theory and practice of radiation dosimetry as applied to radiation protection. Discussion of biological and physical bases for radiation safety standards. Prerequisites: Mathematics 308; Physics 220; or approval of the instructor.

**610. Design of Nuclear Reactors. (3-0). Credit 3. II**

This course applies the fundamentals of nuclear physics and reactor theory with engineering fundamentals to the design of nuclear reactors. Prerequisites: Nuclear Engineering 601, 602.

**615. Nuclear Radiation Detection. (3-0). Credit 3. I**

The interaction of radiation with matter and the behavior of ion pairs in the presence of electric fields are discussed. The theory of operation is presented for the following radiation detection devices: ion chambers, proportional and G-M counters, scintillation detectors, Cerenkov counters, emulsions, cloud chambers, bubble chambers, and activation detectors. Prerequisite: Mathematics 307.

**618. Nuclear Control Systems. (3-0). Credit 3. II**

The fundamentals of servocontrol are developed and applied to a nuclear reactor. The safety aspects of reactor control and operational problems are discussed. Prerequisites: Nuclear Engineering 601, 602.

**621. Nuclear Metallurgy. (3-0). Credit 3. II**

The physical and metallurgical properties of metals used in nuclear reactors and the reasons for their use are considered. Prerequisite: Mechanical Engineering 409.

**622. Nuclear Power Plant Design and Analysis. (3-0). Credit 3. II**

This course is designed to present the application of nuclear reactor systems to the field of power production, utilizing the general fields of thermodynamics and heat transfer, along with special problems arising from a nuclear system. Prerequisites: Mechanical Engineering 323 or 328; Nuclear Engineering 601.

**625. Nuclear Reactor Theory. (4-0). Credit 4. I**

Advanced treatment of neutron transport with and without spectrum regeneration. Integrodifferential and integral Boltzmann equations and their adjoints. Methods of solution including exact, complete set representations, integral transforms and numerical quadrature. Multigroup diffusion and transport theory. Spatially dependent and independent kinetics. Perturbation theory for steady-state and transient phenomena. Prerequisites: Mathematics 602 or 617; Nuclear Engineering 602.

**626. Nuclear Reactor Theory. (4-0). Credit 4. II**

Continuation of Nuclear Engineering 625. Variational principles for discrete and continuous eigenvalues with applications to problems with and without spectrum regeneration. Milne problem and the Wiener-Hopf technique. Serber-Wilson and Feynman methods. Spatially independent and dependent slowing-down theory. Neutron thermalization in light and heavy elements. Prerequisite: Nuclear Engineering 625.

**681. Seminar. (1-0). Credit 1. I, II**

Special topics in nuclear engineering which are not covered by formal course work. Whenever possible, guest lecturers will discuss topics which they have personally investigated. Prerequisite: Graduate classification.

**685. Problems. Credit 1 to 4 each semester. I, II**

This course is offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II, S**

Research toward thesis or dissertation.

## Department of Oceanography and Meteorology

Professor D. F. Leipper,
Professors R. G. Bader, D. W. Hood, K. M. Rae, R. O. Reid, B. W. Wilson; Associate Professors H. J. McLellan, V. E. Moyer, A. H. Thompson; Assistant Professors K. C. Brundidge, W. H. Clayton, J. D. Cochrane, G. A. Franceschini, W. K. Henry, S. M. Ray; Instructors S. J. Hall, E. R. Ibert, T. E. Sanford

### METEOROLOGY

**317. Meteorological Instruments, Observations, and Communications. (2-3). Credit 3. I, II**

Theory, design, and accuracy of standard meteorological instruments; surface weather observations; weather codes and symbols; global and local weather networks; methods and forms of data transmissions; data presentation and elementary data analysis. Prerequisites: Mathematics 120 or 209; Physics 202 or 219.

**318. Meteorological Instruments, Observations, and Communications. (1-3). Credit 2. I, II**

Methods and instruments for aerological observation, including the theory and limitations of pilot balloon, radiosonde, rawin and radar observations; computation, coding, and plotting of data. Forms of data representation; meteorological charts and diagrams; techniques of data analysis. Prerequisite: Meteorology 335.

**325. Physical Climatology. (3-0). Credit 3. I, II**

The horizontal, vertical, and seasonal distributions of meteorological elements in their relation to such basic controls as solar and terrestrial radiation, physiography, rotation of the earth, the general circulation, air mass exchange, and various atmospheric processes. Prerequisite: Physics 202 or 219.

**326. Regional Climatology. (2-0). Credit 2. II, S**

The broader climatic regimes of the earth and the physical basis for their differences; tropical and polar climatology; local climates; introduction to microclimatology. Prerequisite: Meteorology 325.

**335. Atmospheric Statics and Thermodynamics. (3-0). Credit 3. I, II**

Geopotential; chemical composition of the atmosphere; the physical variables; the hydrostatic equation; hypsometry; thermodynamics of dry, moist, and saturated air; mixing and convection; thermodynamic charts and diagrams; thermodynamics applied to atmospheric analysis and weather processes. Prerequisites: Mathematics 210; Physics 202 or 219.

**336. Atmospheric Motions. (3-3). Credit 4. I, II**

Kinematics; conservation equations; equations of motion; geostrophic and accelerated motions; streamlines; trajectories; circulation and vorticity theorem; dynamics of wind systems. Prerequisites: Mathematics 307; Meteorology 335.

**445. Atmospheric Physical Processes. (3-0). Credit 3. I, II, S** †

The physics of heat, moisture, and momentum transfer in the atmosphere; radiation, evaporation, condensation, advection, convection, turbulence, and diffusion; their consequences upon the weather. Prerequisite: Meteorology 336.

**457. Fundamentals of Weather Analysis. (1-12). Credit 5. I, II, S**

Theory, methods, and practice of synoptic weather analysis in three dimensions. Detailed studies of the structure and motions of air currents, fronts, cyclones, anticyclones, pressure waves, tropical storms, and other features of the circulation. Prerequisites: Meteorology 318, 336.

**458. Weather Analysis. (1-12). Credit 5. I, II, S** †

A continuation of Meteorology 457, but with the emphasis on motions of wind and weather patterns and on weather sequence. Introduction to principles and methods of prognosis and weather forecasting. Prerequisites: Meteorology 445, 457.

**465. Agricultural Meteorology. (2-0). Credit 2. II** †

Study of principles of meteorology as they are related to agriculture, with special emphasis upon the climate of the surface layers of the atmosphere. Prerequisite: Approval of the instructor.

## FOR GRADUATES

**600. Survey of Meteorology and Oceanography. (3-0). Credit 3. S**

A survey course in meteorology and oceanography designed for teachers of secondary school science. Prerequisite: Approval of Heads of Departments of Oceanography and Meteorology and of Education and Psychology.

**636. Dynamic Meteorology. (3-0). Credit 3. II**

A formal treatment of the principles of fluid dynamics as they apply to the atmosphere; the Navier-Stokes equations; perturbation theory, energy equations and transformations, vorticity, barotropic and baroclinic systems, cyclone theories, and numerical weather prediction. Prerequisites: Mathematics 601; Meteorology 336; or the equivalent.

**646. Atmospheric Physics. (3-0). Credit 3. I, S**

Fog, cloud, and precipitation physics; thunderstorms; atmospheric electricity; optical and acoustical phenomena. Prerequisite: Meteorology 445.

**647. Meteorology of the Upper Atmosphere. (3-0). Credit 3. I**

Study of the composition, structure, and characteristic phenomena of the extratropospheric terrestrial atmosphere based on balloon rocket, artificial satellite, and various indirect measurements. Prerequisite: Bachelor of Science degree in science or engineering.

**648. Cosmic Meteorology. (3-0). Credit 3. II**

Continuation of Meteorology 647. Examination of the properties and processes of the atmospheres of the other planets: composition, structure, clouds, and circulations, and their implications in terrestrial meteorology. Prerequisite: Meteorology 647.

**658. Weather Analysis. (2-6). Credit 4. I**

Discussion, application, and critical evaluation of methods employed by American and foreign centers for analyzing and forecasting circulation and weather patterns over periods up to 3 days; objective analysis and numerical prediction; recent developments; techniques for analysis of specific weather patterns. Prerequisites: Meteorology 457 or the equivalent; approval of Head of Department.

**665. Micrometeorology. (3-0). Credit 3. II**

A study of the physical processes occurring at the interface between earth and atmosphere, with special emphases upon evaporation, turbulent diffusion of gases, variations in wind, temperature, and humidity in the lowest few meters of the atmosphere. Prerequisites: Mathematics 308; Meteorology 445; Physics 301.

**675. Radar Meteorology. (3-0). Credit 3. I, II**

Study of the theory and practice of radar storm observations. Prerequisites: Meteorology 445, 457.

**676. Hydrometeorology. (3-0). Credit 3. II**

The role of weather and weather processes in land water problems. Prerequisite: Meteorology 326 or approval of the instructor.

**679. Military Applications of Meteorology. (3-0). Credit 3. I, S**

Applications of meteorological knowledge and data to related activities and problems in the national defense not under security classification. Prerequisite: Meteorology 457.

**681. Seminar. (2-0). Credit 2. II**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in meteorology to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## OCEANOGRAPHY

**201. Sea and Air Sciences. (1-0). Credit 1. I, II, S**

Oceanography and meteorology as scientific career fields. Features of the natural environment which affect man's daily life and activities. A survey course open to all college students.

**401. Introduction to Oceanography. (3-0). Credit 3. I, II, S** †

The various aspects of oceanography with emphasis upon those pertinent in the Gulf of Mexico. The principles upon which the disciplines of the subject are based. The unity of the marine sciences and their importance to man. The relations between oceanography and the fields of biology, chemistry, engineering, geography, geology, mathematics, meteorology, and physics. Opportunities in oceanography. Prerequisite: Senior classification in engineering or in a biological or physical science or the approval of the instructor.

## FOR GRADUATES

**601. Research Methods in Oceanography. (1-0). Credit 1. I, II, S**

Selection of a research problem for thesis work; planning the program of investigation. Prerequisites: General prerequisites for oceanography.

**603. Sea Laboratory Techniques. (0-6). Credit 2. S**

Practice in techniques used regularly aboard ship and in collecting field data. Cruise planning, navigational methods, collection of hydrographic, bathymetric and meteorological data, sediment sampling, biological sampling, and the collection of water samples for chemical analysis will be stressed. Prerequisites: General prerequisites for oceanography.

**610. Physical Oceanography. (3-0). Credit 3. I, II**

Survey of the physics of the sea; physical properties, transmission of light and sound in the sea, sea ice; heat budget of the sea and transformation of energy within the sea and at the boundaries; evaporation from the sea, description of water masses and their origin; the horizontal and vertical circulation of the seas; the applied dynamic and kinematic formulas for circulation in the sea; the concept of dynamic equilibrium of the different concentrations within the sea; introduction to waves and tides of the sea. Prerequisites: General prerequisites for oceanography.

**611. Theoretical Physical Oceanography. (3-0). Credit 3. II**

Theoretical and quantitative aspects; equations of motion; equation of continuity; boundary conditions; distribution of properties in the presence of diffusion; heat budget; stability; dynamics and computation of ocean currents; wind currents; turbulence; friction. Prerequisites: Mathematics 601 or registration therein; Oceanography 610.

**612. Theory of Ocean Waves. (3-0). Credit 3. II**

Theory of simple harmonic surface waves; wave groups and group velocity, wave energy and energy propagation, dispersion. Theory of generation and decay of surface waves. Waves of large steepness, including solitary and cnoidal waves. Modification of waves in shallow water, refraction; wave ray analysis and the phase diagram. Capillary waves; internal waves and shear waves. Prerequisites: Mathematics 308; Oceanography 610.

**613. Engineering Aspects of Oceanography. (3-0). Credit 3. I**

Applications of oceanographic knowledge in engineering. Sea disturbances, astronomical tides, seismic sea waves, seiches, surging in harbors, wind generation of ocean waves. Practical wave forecasting; wave refraction diagram analysis; propagation of waves in shallow water, breaking waves. Principles of similitude, fluid resistance, wave forces on fixed and floating structures. Sediment movement; coastal erosion and stabilization. Harbor location and design; breakwater, and dike construction. Density currents in estuaries; diffusion and dispersal and pollutants. Prerequisites: Mathematics 308; Oceanography 610.

**614. Dynamics of the Ocean and Atmosphere. (3-0). Credit 3. I**

Advanced theory of the ocean dynamics, a comparison of the hydrodynamic and thermodynamic character of the ocean and the atmosphere; the mutual dependence of the dynamics and thermodynamics of the sea on those of the air and vice versa; some special theories from the mean equations of motion, gradient wind, jet stream, mutual adjustment of the mass field and velocity field in the sea; mutually coupled temperature variations of the sea and the air; wind driven currents; the general hydrodynamic problem of the ocean and of the atmosphere, and an investigation of its uniqueness; the maintenance of the general circulation. Prerequisites: Mathematics 602; Oceanography 611. (Offered in 1959-60 and in alternate years thereafter)

**620. Biological Oceanography. (3-0). Credit 3. II**

Critical study of important contributions defining major biological divisions, provinces, and life zones of the oceans; effects of climate, chemical, and physical barriers, and phylogeny on zoogeography; factors relating to population cycles; productivity problems; ecological inter-relationships of major groups of plants and animals in the sea. Prerequisites: General prerequisites for oceanography.

**621. Biological Oceanography of the Gulf of Mexico. (1-6). Credit 3. I**

Detailed examination of selected aspects of biological oceanography which are of major importance to the Gulf of Mexico. Prerequisites: Oceanography 620, undergraduate major in biology, or approval of instructor.

**630. Geological Oceanography. (3-0). Credit 3. II**

Topography and characteristic features of the ocean bottom; marine shorelines and processes operating in the coastal zone; nature of marine sediments; marine transportation and deposition of sedimentary materials; erosion of beaches. Prerequisites: General prerequisites for oceanography.

**631. Geological Oceanography of the Gulf of Mexico. (2-3). Credit 3. I**

Topography, stratigraphy, paleontology, and environments of the Gulf; littoral region and adjacent plains; forces acting on shorelines and bottoms; depositional surfaces, equilibria, equilibrium structures; tectonics; pleistocene history of region. Field trips. Prerequisite: Undergraduate major in geology.

**640. Chemical Oceanography. (3-0). Credit 3. II**

The chemical composition and properties of sea water; the definition and calculation of salinity; the pH, excess base, and carbon dioxide system in the sea; nutrients, their cycles and their distribution; oxygen and other dissolved gases; chemistry of sedimentation; composition of organisms and organic constituents of sea water; marine corrosion; extraction of raw materials from the sea. Prerequisites: General prerequisites for oceanography.

**641. Chemical Oceanography. (3-0). Credit 3. I**

Detailed study of selected topics in chemical oceanography which pertain to the Gulf of Mexico; industrial utilization of sea water and chemical products obtained from marine plants and animals; water freshening; industrial corrosion problems; chemical aspects of photosynthesis and fertility of the sea; chemistry of estuarine waters. Prerequisites: Oceanography 640; undergraduate major in chemistry; approval of the instructor.

**642. Laboratory Techniques in Oceanography. (0-6). Credit 2. I**

Detailed study will be made of methods of preparation and analysis of samples for biological, chemical, and geological investigations. The methods of analysis will concern oxygen, phosphate, silicate, nitrate, nitrite, salinity, carbon, sediment particle size, mineralogy, organic production, and others. Prerequisites: Oceanography 603, 610, 620, 630, 640, or approval of the instructor.

**643. Geochemistry of the Ocean. (3-0). Credit 3. I**

Geochemistry of the oceanic hydrosphere, biosphere, and lithosphere; how these are related to the atmosphere; study of the elements within them. Prerequisites: Oceanography 630, 640, and 641 or graduate classification in geology. (Offered in 1961-62 and in alternate years thereafter.)

**644. Geochemistry of the Ocean. (3-0). Credit 3. II**

A detailed critical study of the geochemistry of sedimentation, the geochemical evolution of the ocean, the biogeochemistry of calcium carbonate and isotope geochemistry as related to the ocean. Prerequisite: Oceanography 643.

**651. Meteorological Oceanography. (1-3). Credit 2. I**

The use of the conservative characteristics of the sea in forecasting meteorological and oceanographic phenomena. Calculation of ocean waves and swell, transformation of waves in shallow water, statistical summaries, modification of air masses in contact with the ocean, forecasting of fog and squalls, effect of the oceans upon climate of the world, meteorological tides. Prerequisite: Oceanography 610.

**652. Boundary Layer Problems. (3-0). Credit 3. I**

Theory of radiative exchange of energy at the sea surface; the theory of turbulent flow over hydrodynamically rough and smooth surfaces with application to the evaluation of the fluid frictional stresses at the boundaries of the sea, the evaluation of wind stress, evaporation, etc.; the micro-structure of temperature and salinity near the ocean surface; evaluation of turbulent exchange coefficients. Prerequisite: Oceanography 611. (Offered in 1960-61 and in alternate years thereafter).

**681. Seminar. (2-0). Credit 2. I**

Presented by students and based upon their research work and upon surveys of the literature.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course offered to enable majors in oceanography to undertake and complete with credit in their particular fields of specialization limited investigations which do not fall within their thesis research and which are not covered by any other courses in the established curriculum. An example of the solution of a special problem in oceanography would be the work done in analyzing a special set of data collected on a cruise at sea. The course may also consist of a special series of problem discussions not given periodically, such as those offered by visiting scientists. Prerequisites: Oceanography 610, 630, 640.

**691. Research. Credit 1 or more each semester. I, II, S**

For thesis or dissertation. Topic subject to approval of the Head of the Department.

## Department of Petroleum Engineering

Professor R. L. Whiting,
Professors J. W. Amyx, R. B. Bossler, J. C. Calhoun, Jr., H. T. Kennedy;
Associate Professors D. M. Bass, Jr., J. R. Pedigo, R. E. Wainerdi

**300. Petroleum Engineering Field Problems. (1-6). Credit 3. S**

A field study of the problems encountered in oil and gas fields. Course consists primarily of visits to oil and gas fields. The requirements of this course will not permit a student to take any other course at the same time. Prerequisite: Completion of junior petroleum engineering courses.

NOTE: This course may be taken in place of field work as required of all graduates in petroleum engineering. Field work or this course required before registration in any of the senior or fifth year petroleum engineering courses.

**305. Petroleum Development. (2-0). Credit 2. I**

Principles of oil field development, rotary and cable tool drilling methods, drilling fluids, oil field hydrology. Prerequisites: Geology 201, 207; Mathematics 307; Physics 219.

**306. Reservoir Rock Properties. (2-0). Credit 2. II**

A systematic study of the physical properties of petroleum reservoir rocks with particular emphasis on porosity, permeability, relative permeability, capillary characteristics, homogeneous and heterogeneous rock systems. Prerequisites: Petroleum Engineering 305, 307.

**307. Petroleum Development Laboratory. (0-3). Credit 1. I**

Properties of petroleum; operation of rotary drilling rig; well surveying practices; tests on drilling fluids and cements. Prerequisite: Petroleum Engineering 305 or registration therein.

**308. Rock and Fluid Properties Laboratory. (0-3). Credit 1. II**

Core analysis, capillary pressure and relative permeability tests, fluid displacement tests; differential and flash vaporization tests of gas saturated crude oil at elevated pressure and temperature. Prerequisites: Petroleum Engineering 306, 310, or registration therein.

**310. Reservoir Fluids. (2-0). Credit 2. II**

Thermodynamic behavior of natural occurring hydrocarbon mixtures. Evaluation and correlation of physical properties of petroleum reservoir fluids, laboratory and empirical methods. Prerequisites: Chemistry 323; Petroleum Engineering 305, 307.

**312. Well Logging. (1-0). Credit 1. II**

A preliminary study of logging methods with particular attention to electric logging and radioactive logging as they would be applied in the petroleum industry. Prerequisite: Geology 210.

**402. Petroleum Property Management. (3-0). Credit 3. II** †

Factors which influence the value of oil and gas properties; preparation of valuation reports, cost data, operating organization, regulation of petroleum production. Prerequisites: Petroleum Engineering 409, 413, 428.

**405. Drilling and Production Design. (2-2). Credit 3. I** †

A study of the selection of drilling and production equipment used in oil field practice. Design of drilling and production systems. Prerequisites: Civil Engineering 305; Petroleum Engineering 305, 306, 307, 308, 310, 312.

**409. Subsurface Engineering. (1-3). Credit 2. I** †

Well logging, contour maps, isopachous maps, and the determination of the size, shape, and volume content of petroleum reservoirs. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**413. Petroleum Measurement and Transportation. (2-2). Credit 3. I** †

Theory and methods of gas and liquid measurements and transportation including mixed streams, horizontal and vertical flow, etc. Prerequisites: Mechanical Engineering 346; Petroleum Engineering 310.

**414. Petroleum Production Engineering. (2-0). Credit 2. II** †

Gas lift, surface separation and treatment of oil field fluids. The measurement, sampling and testing of crude oil, tank strapping and preparation of tank tables, oil storage, the prevention of loss by evaporation, fire and lightning protection. Prerequisites: Petroleum Engineering 405, 413.

**415. Measurements Laboratory. (0-3). Credit 1. I** †

Methods of metering petroleum and natural gas. Study of flow of liquid gas and mixtures of gas and liquid. Advanced study of properties of petroleum at elevated pressure and temperature. Prerequisite: Petroleum Engineering 413 or registration therein.

**416. Oil Measurements and Transportation Laboratory. (0-3). Credit 1. II** †

Gauging practices, treating of oil-water emulsion, heat and sulphur content of petroleum and its products, determination of viscosity, gravity water content, carbon residue, and the coefficient of expansion of petroleum. Determination of vapor pressure of natural gasoline. Distillation of crude oil and gasoline. Methods of metering petroleum. Water analysis. Prerequisite: Petroleum Engineering 414 or registration therein.

**419. Drilling Fluids. (0-3). Credit 1. II** †

A laboratory course in which field technique and control of mud fluids to facilitate drilling are taught. Prerequisites: Senior classification in petroleum engineering; approval of the Head of the Department.

**428. Reservoir Engineering. (2-0). Credit 2. I** †

Material balance methods, including identification of type of reservoir mechanism, future production under primary recovery and gas injection; water influx calculations. Prerequisites: Petroleum Engineering 306, 308, 310.

**429. Reservoir Mechanics Laboratory. (0-3). Credit 1. I** †

A laboratory course to supplement the theory of Petroleum Engineering 428. Advanced core analysis; fundamental tests of PVT properties of petroleum at reservoir conditions. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310.

**438. Reservoir Engineering. (2-0). Credit 2. II** †

Continuation of Petroleum Engineering 428. Displacement of oil by extraneous fluids, evaluation of performance of combination drive reservoirs, sweep efficiency. Prerequisite: Petroleum Engineering 428.

**481. Petroleum Engineering Seminar. (0-2). Credit 1. I** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

**482. Petroleum Engineering Seminar. (0-2). Credit 1. II** †

The study and presentation of papers pertaining to recent developments in the field of petroleum engineering. Prerequisites: Petroleum Engineering 305, 306, 307, 308, 310, 312.

## FOR GRADUATES

**601, 602. Drilling and Completing Wells. (3-3). Credit 4 each semester. S**

An advanced study of the problems encountered in the drilling and completing of oil and gas wells. Prerequisite: Approval of Head of Department.

**603, 604. Advanced Reservoir Engineering. (3-3). Credit 4 each semester. I, II**

An advanced course in petroleum production practices with special reference to the fundamental principles of flow of reservoir fluids. Prerequisite: Approval of Head of Department.

**605. Phase Behavior of Petroleum Reservoir Fluids. Credit 2 to 4 each semester. I**

A study of the pressure, volume, temperature, composition relationships of petroleum reservoir fluids. Prerequisite: Approval of Head of Department.

**607. Recovery Methods. Credit 2 to 4 each semester. II**

A study of methods of increasing recovery of petroleum from petroleum reservoirs. Prerequisite: Approval of Head of Department.

**608. Well Logging Methods. (2-3). Credit 3. II**

An advanced study of well logging methods for determining the nature and fluid content of formations penetrated by the drill. Prerequisite: Approval of Head of Department.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

A study and presentation of papers on recent developments in reservoir mechanics. Prerequisite: Approval of Head of Department.

**685. Problems. Credit 1 to 4 each semester. I, II**

A course offered to enable students to undertake and complete limited investigations which do not fall within their thesis research and which are not covered by any other courses in the curriculum. Prerequisite: Graduate classification.

**691. Research. Credit 1 or more each semester. I, II**

Advanced work on some special problem within the field of petroleum engineering. A thesis course. Prerequisite: Approval of the Head of Department.

## Department of Physics

Professor J. G. Potter,
Professors J. B. Coon, Melvin Eisner, E. G. Smith, D. F. Weekes; Associate Professors P. W. Barker, C. H. Bernard, B. B. Boriskie, J. S. Ham; Assistant Professors M. M. Duncan, Jr., C. M. Loyd, R. W. Mitchell, R. K. Russell, F. C. Whitmore; Instructors C. E. Blount, S. M. Bucaram, W. G. Cantrell, J. P. Decker, G. S. Harmon*, A. E. Hoffman, C. E. Jones*, R. E. Smith, D. R. Wiff, B. T. Young

Students who present for transfer courses in college physics of less credit value than the required courses in this college may validate their transfer work and receive credit in physics by examination if they wish to do so.

Normally, however, students transferring with from 8 to 10 hours of physics into curricula requiring 12 hours should register for Physics 220.

**201. College Physics. (3-3). Credit 4. I, II, S**

An elementary course with material selected especially with reference to the needs of premedical and predental students and students of architecture and education. Fundamentals of classical mechanics, heat, and sound. Prerequisite: Mathematics 103.

**202. College Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 201. Fundamentals of classical electricity and light and introduction to contemporary physics. Prerequisite: Physics 201.

**211. A Brief Survey of Physics. (3-3). Credit 4. II**

A course designed to acquaint students with a field of knowledge and contemporary activity of importance in modern thinking. Prerequisite: Mathematics 102.

**213. Physics for Students of Agriculture. (2-2). Credit 3. I, II**

A brief course emphasizing fundamentals of special importance to students of agriculture in the fields of mechanics, heat, light, and electricity. Prerequisite: Mathematics 101.

**215. Introductory Physics. (2-3). Credit 3. I**

A course for pre-veterinary medicine students restricted to those topics in physics of importance to all students of veterinary medicine. The material of the first semester is in the fields of mechanics, heat, and sound. Laboratory exercises emphasize measurements, concepts, and the experimental basis of physics. Prerequisites: Mathematics 102, 103.

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*On leave of absence.

**216. Introductory Physics. (2-3). Credit 3. II**

A continuation of Physics 215. The material of the second semester is in the fields of light, magnetism and electricity, and atomic, molecular, and nuclear phenomena. Prerequisite: Physics 215.

**218. Mechanics and Heat. (3-3). Credit 4. I, II, S**

A comprehensive course for students of engineering and the physical sciences, providing the background for many of the engineering courses as well as for other physics courses. Cultivation of the capacity to utilize the fundamental concepts in the solution of problems is emphasized. Mechanics, heat. Prerequisite: Mathematics 120 or 209 or registration therein.

**219. Sound, Light, Electricity. (3-3). Credit 4. I, II, S**

A continuation of Physics 218. Sound, light, and electricity. Prerequisite: Physics 218.

**220. Modern Physics. (3-3). Credit 4. I, II, S**

A continuation of Physics 218 and 219. Atomic physics, nuclear physics, and solid state physics. Prerequisites: Mathematics 210; Physics 219.

**301. Heat. (3-3). Credit 4. I** †

Heat transfer, specific heats, development of thermodynamic concepts introducing statistical mechanics and kinetic theory, phase and change of state, and radiation. Prerequisites: Mathematics 210; Physics 220.

**302. Mechanical Properties of Matter. (2-3). Credit 3. II** †

Rotational inertia, simple harmonic motion of translation and rotation, Kater's pendulum, gravitational fields and potential theory, gyroscopic motion, elasticity of beams, torsion, theory of elasticity, elasticity of fluids, surface tension and its application to the optimum shape for pressure vessels, diffusion, units and dimensions. Special attention is given to the setting up of equations representing physical facts, the interpretation of their solutions, and the determination of the limitations imposed by each approximation and assumption. Prerequisites: Mathematics 308 or registration therein; Physics 218.

**310. Applications of Modern Physics. (2-2). Credit 3. II**

A comparatively non-technical survey of modern applications of atomic and nuclear phenomena of interest to students of geology, biochemistry, genetics, biology, engineering, and especially premedical and predental students. Electrons, ions, isotopes, spectra, x-rays, atomic structure, radioactivity, atomic particles, nuclear accelerators, induced radioactivity, radioactive tracers, nuclear reactors, and atomic energy. Some demonstration laboratory work will accompany certain phases of the course. Prerequisites: Chemistry 101; Physics 202, 216, or 219.

**311. Atomic and Nuclear Physics. (3-0). Credit 3. I** †

The particles of modern physics, quantum theory, relativity, atomic structure, electrical phenomena in gases, liquids and solids, x-rays, the solid state, nuclear structure and transmutations, cosmic rays, nuclear forces, fission, and fusion. Prerequisite: Physics 220.

**312. Atomic and Nuclear Physics. (2-3). Credit 3. II** †

An extension of Physics 311 to more advanced phases of atomic nuclear, molecular, and solid state theory. Laboratory exercises utilize the specialized equipment of modern physics research. Prerequisite: Physics 311.

**314. Survey of Astronomy. (3-0). Credit 3. I**

A study of the solar system, meteors, asteroids, comets, stars, clusters, nebulae, Kepler's laws, laws of gravitation, astronomical instruments. Occasional evening meetings will be held for observation. Prerequisites: Mathematics 101, 103.

**317. Celestial Mechanics. (4-0). Credit 4. I** †

A mathematical formulation of the principles of celestial mechanics, central forces, potentials and attractions of bodies, the problem of two bodies, the problem of three bodies, the problem of **n** bodies. Prerequisites: Mathematics 307; Physics 201 or 218.

**322. Intermediate College Physics. (4-6). Credit 6. S**

A course for high school and junior high school science teachers and elementary science supervisors designed to fortify their preparation to a level where they can pursue upper division specialized physics courses. A review of classical physics and a brief introduction to modern physics. Prerequisite: At least six hours of credit in college physics.

**323. Topics in Electricity and Electronics. (2-3). Credit 3. S**

Topics will be treated which high school and junior high school science teachers and elementary science supervisors will be able to pursue in the instruction in their schools. Prerequisites: Mathematics 210; Physics 202, 219 or 322.

**401. Optics. (3-3). Credit 4. I** †

A systematic treatment of physical and geometrical optics, applications to optical instruments. Prerequisites: Mathematics 210; Physics 220.

**405. Physical Mechanics. (3-0). Credit 3. I** †

A comprehensive formulation of the principles of mechanics, employing the calculus and vectoral methods. Orbital motion, Coriolis acceleration, motions of rigid bodies, vibrations. Prerequisites: Mathematics 405 or registration therein; Physics 302 or the equivalent.

**411. Experimental Modern Physics. (0-6). Credit 2. II** †

Selected practical topics of atomic and nuclear physics are pursued to the point where measurements and investigations are conducted in the laboratory. Prerequisite: Physics 311.

**413. Electricity and Magnetism. (2-3). Credit 3. II** †

DC and AC circuit theory, thermal and chemical electromotive forces, electrical instruments, electron emission. Prerequisites: Mathematics 308; Physics 219.

**414. Electricity and Magnetism. (1-3). Credit 2. II** †

Non-linear circuits, functions of tubes in electrical circuits, electronic circuits and circuit elements for physical measurements. Prerequisite: Physics 413 or approval of the instructor.

**416. Electromagnetic Fields. (3-0). Credit 3. II** †

Electric and magnetic field theory with emphasis on vector analysis and culminating in an introduction to electromagnetic radiation; properties of dielectrics and magnetic materials. Prerequisites: Mathematics 405 or 601; Physics 413 or approval of the instructor.

**418. Theoretical Physics. (3-0). Credit 3. II** †

An introduction to theoretical physics with emphasis on fundamental concepts and general principles. Prerequisites: Mathematics 307; Physics 219.

**420. Introduction to Astrophysics. (3-0). Credit 3. II** †

An introduction to the theory and application of astrophysics. The physics of the sun's core, the internal structure of stars, spectroscopic and dynamic aspects of stellar atmospheres, radiation from the sun and stars, interstellar matter, the origin and evolution of planetary atmospheres. Prerequisites: Mathematics 307 or registration therein; Physics 220, 314, and a course in heat or thermodynamics.

**421. Celestial Mechanics. (3-0). Credit 3. II** †

A continuation of Physics 317. The laws of binary star systems, the determination of orbits, perturbations of the moon, general perturbations, the problem of satellites. Prerequisite: Physics 317.

## FOR GRADUATES

**600. Physics for Secondary School Teachers. (2-3). Credit 3. S**

This course taught by members of the Physics faculty will aim to develop convictions concerning the fundamental principles of classical and modern physics which should be taught in a course in high school physics and to develop techniques and methods of preparing and conducting demonstrations and laboratory exercises. Prerequisites: Graduate classification; approval of the Heads of the Education and Physics Departments.

**601. Analytical Mechanics. (4-0). Credit 4. I, S**

Dynamics of particles and of rigid bodies, gyrodynamics, potential theory, Hamilton's principle, principle of least action. Lagrange's equations, and the Hamilton-Jacobi equation, with applications. Prerequisites: Mathematics 405 or 601; Physics 405.

**602. Fluid Mechanics and Elasticity. (4-0). Credit 4. II**

Mechanics of continuous media. Foundations of elasticity with application to theory of beams, plates, and shells. Hydrodynamics of viscous and nonviscous fluids. Supersonic flow and shock wave propagation. Boundary layer theory. Lubrication theory. Prerequisite: Physics 601 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**603. Electromagnetic Theory. (4-0). Credit 4. II, S**

Theory of electromagnetism; static and time-varying fields; propagation, reflection, and refraction of electromagnetic waves. Prerequisites: Mathematics 601 or the equivalent; Physics 416 or the equivalent.

**605. Thermodynamics. (4-0). Credit 4. II, S**

The fundamentals of classical thermodynamics, including the first and second laws, thermodynamic potentials, conditions for equilibrium, properties of gases; thermodynamics of electromagnetic systems, and a brief treatment of kinetic theory including Maxwell's velocity distribution law, viscosity, and diffusion. Prerequisites: Mathematics 308; Physics 301 or the equivalent.

**607. Statistical Mechanics. (4-0). Credit 4. I**

Fundamentals of classical and quantum statistical methods and their application to physical systems. The statistical basis of entropy; the specific heats of gases and crystals; electronic phenomena in metals; super-fluidity; black-body radiation; and other applications to atomic and nuclear physics. Prerequisite: Approval of the instructor.

**611. Advanced Optics. (4-0). Credit 4. I**

The electromagnetic theory of optical phenomena in discontinuous, isotropic, and anisotropic media. Prerequisite: Physics 603. (Offered in 1961-62 and in alternate years thereafter.)

**612. Atomic Structure. (3-0). Credit 3. I, S**

A study of the atom and atomic spectra from the quantum mechanical viewpoint including the hydrogen atom, perturbation method, complex atoms, transition probabilities, angular momentum operators, multiplet structure of energy levels, fine structure and electron spin. Prerequisites: Mathematics 308 or the equivalent; Physics 311.

**614. Molecular Structure. (4-0). Credit 4. I**

The quantum mechanical theory of valence; the hydrogen molecule ion, molecular orbitals for diatomic molecules; the hydrogen molecule; coulombic and exchange integrals; Pauli exclusion principle and the covalent bond; hybrid atomic orbitals; general molecular orbital method. Prerequisite: Physics 612. (Offered in 1960-61 and in alternate years thereafter.)

**617. Physics of the Solid State. (3-0). Credit 3. I, S**

A study of the electrical, magnetic, thermal, and mechanical properties of crystalline solids. Lattice energy of ionic crystals, lattice vibrations, dielectric phenomena, luminescence and phosphorescence, electron theory of metals, band theory, semi-conductors, low temperature behavior of solids. Prerequisites: Mathematics 308, 405 or the equivalent; Physics 220 or the equivalent.

**618. Nuclear Theory. (3-0). Credit 3. I, S**
Application of quantum mechanics to nuclear phenomena. Prerequisites: Physics 623, 625, or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**623. Quantum Mechanics. (4-0). Credit 4. S**
Foundations of quantum mechanics; theories of Heisenberg and De Broglie with applications especially to nuclear physics. Prerequisites: Mathematics 602 or the equivalent; Physics 601, 612, 625.

**624. Quantum Mechanics. (4-0). Credit 4. I**
A continuation of Physics 623. A postulational development of the foundations of quantum mechanics; classical foundations, Hamiltonian formalism, canonical transformations, representation and expansion theory, relativistic-quantum mechanics, quantum electrodynamics, quantum field theory, fundamental particles, meson field theories, and high energy phenomena. Prerequisite: Physics 623.

**625. Nuclear Structure. (3-0). Credit 3. II, S**
Properties of fundamental particles; theory of simple nuclear models; scattering, spins, magnetic moments and cross sections; alpha, beta, and gamma decay; detection, measurement, and production of nuclear particles; nuclear spectroscopy; interactions of nuclear radiations with matter; nuclear reactions; high energy nuclear phenomena. Prerequisites: Mathematics 308, 601; Physics 312 or the equivalent.

**627. Relativity. (3-0). Credit 3. I, S**
Special relativity and its application to covariant formulations of mechanics and electrodynamics. Theory of general relativity including development of necessary tensor calculus and non-Euclidean geometry. Predictions of general relativity and experimental tests of theory; cosmological problems and unified field theories. Prerequisites: Physics 601, 603.

**631. Quantum Theory of Solids. (3-0). Credit 3. II**
Development of solid state theory from the basic theory of quantum mechanics. Theory of perfect and imperfect crystal lattices. Interaction of electromagnetic radiation with non-conducting crystals. Electrons in perfect crystal lattices. Theory of metallic cohesion. Transport phenomena. Electric and magnetic properties of solids. Semiconductors, superconductors, superfluids. Prerequisite: Physics 617.

**633. Experimental Physics. (0-3). Credit 1. I, II, S**
Experiments in atomic, nuclear, and solid state physics, designed to complement theory courses in these fields and to prepare the student for experimental research in physics. Prerequisite: Graduate classification.

**661. Radiological Physics. (3-0). Credit 3. II**
Interaction of radiation with matter, health physics and radiation protection, reactor sources of radiation, shield design. Prerequisites: Mathematics 308; Nuclear Engineering 401 or Physics 312.

**663. Reactor Theory. (3-0). Credit 3. I**
Mathematical theory of the diffusion and slowing down of neutrons in the homogeneous nuclear reactor without reflector and with reflector. Prerequisites: Mathematics 308, 601 or registration therein; Physics 312.

**664. Reactor Theory. (3-0). Credit 3. II**
A continuation of Physics 663. The steady state and transient behavior of the heterogeneous reactor. Theory of reactor control. Special mathematical methods in reactor analysis. Extensive problem work to illustrate the applications of the theory. Prerequisites: Mathematics 602 or registration therein; Physics 663.

**665. Theory of Accelerators. (3-0). Credit 3. II**
Description and classification of accelerators. Cockcraft-Walton accelerators, electrostatic generators; linear accelerators; theory of magnetic focusing; cyclotron; theory of electrostatic focusing; stability conditions, betatron; synchrocyclotron; synchrotron; low energy pulse devices; energy measurement and control; instrumentation and techniques; reactions; radiological safety. Prerequisites: Mathematics 307; Physics 312.

**685. Problems. Credit 1 to 4 each semester. I, II, S**
Individual problems not related to thesis.

**691. Research. Credit 1 or more each semester. I, II, S**
Research toward thesis or dissertation.

## Department of Plant Physiology and Pathology

Professor D. W. Rosberg,
Professors W. C. Hall, H. E. Joham, G. M. Watkins; Associate Professors L. S. Bird, W. W. Heck, W. H. Thames, Jr.; Assistant Professors L. J. Ashworth, Jr., M. C. Futrell, C. S. Miller

**301. Plant Pathology. (2-3). Credit 3. I**
An introduction to the fundamental principles of plant pathology, including diagnosis, cause, and control of plant diseases. Prerequisites: Biology 101, 206.

**302. Plant Disease Diagnosis. (0-3). Credit 1. II**
A practice course designed to give the student experience in diagnosing plant disease problems. All categories of plant diseases will be studied. Prerequisite: Plant Physiology and Pathology 301 or approval of the instructor.

**313. Introduction to Plant Physiology. (2-3). Credit 3. I**
A general course dealing with the principal life processes of the higher plants, with particular emphasis on the influence of environmental factors on the processes and development of crop plants. Prerequisites: Biology 101; Chemistry 102.

**314. Principles of Plant Physiology. (3-3). Credit 4. II** †
A more advanced and detailed study of the physiology of green plants than Plant Physiology and Pathology 313, with emphasis on nitrogen metabolism, respiration, mineral nutrition, photosynthesis, and growth. Prerequisites: Chemistry 231; Physics 213; Plant Physiology and Pathology 313.

### FOR GRADUATES

**605. Plant Metabolism. (2-0). Credit 2. I**
Photosynthesis and respiration are discussed in detail, including the history and recent developments in these fields. Prerequisite: Plant Physiology and Pathology 314, or Biochemistry and Nutrition 601 and approval of instructor. (Offered in 1961-62 and in alternate years thereafter.)

**607. Physiology of the Fungi. (3-0). Credit 3. II**
A general course in the physiological activities of fungi, including growth and development, mineral nutrition, carbon and vitamin nutrition, the chemstry of metabolic products, fungicides, and the physiology of parasitism and resistance. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1961-62 and in alternate years thereafter.)

**609. Quantitative Plant Physiology. (2-6). Credit 4. II**
Methods employed in the various types of physiological investigations and the interpretation of results obtained by them. Prerequisite: Plant Physiology and Pathology 314. (Offered in 1961-62 and in alternate years thereafter.)

**611. Plant Nutrition. (3-0). Credit 3. II**

This course deals with the inorganic nutrition of plants. It includes solute absorption, accumulation and translocation; growth of plants in artificial media; physiological roles of various elements in the plant, and biochemical problems associated with salt absorption. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**612. Phytohormones and Plant Growth Regulators. (3-0). Credit 3. I**

This course includes material on the classification, properties, and action of naturally occurring plant hormones as well as a discussion of the synthetic growth regulators. Material is included on practical application and uses of phytohormones and growth regulators. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**613. Plant Growth and Development. (3-0). Credit 3. I**

A course dealing with the growth, differentiation, and development of higher plants. A comprehensive study of vernalization and photoperiodism is included as well as a discussion of the influences of water relations, mineral nutrition, and hormones on the developmental cycle. Consideration is also given to differentiation within the plant as related to such qualities as winter hardiness and drought resistance. Prerequisite: Plant Physiology and Pathology 314 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**616. Methods in Plant Pathology. (2-6). Credit 4. II**

A presentation of the methods by which plant diseases are identified and investigated. Emphasis is placed on preparation for research work in plant pathology. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**617. Parasitism in Plant Disease. (3-3). Credit 4. I**

A critical presentation of the literature on the invasion of plant tissues by parasitic bacteria, fungi, and nematodes. Mechanisms of host defense are examined. Processes are illustrated in the laboratory through the study of histological preparations and by experimentation. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1961-62 and in alternate years thereafter.)

**618. Bacterial Plant Diseases. (2-3). Credit 3. II**

A detailed study of bacterial diseases of fruit and vegetable crops, field crops and ornamental plants, with special emphasis upon the nature of the disease, dissemination of the pathogen and methods of control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**620. Plant Viruses. (2-0). Credit 2. II**

Lecture presentation and discussion of the nature and properties of plant viruses. Methods of virus transmission, host plant reactions to viruses, serological reactions, and methods of purification of viruses for examination under the electron microscope, and the study of economically important plant virus diseases and their control. Prerequisite: Plant Physiology and Pathology 301 or the equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**621. Plant Parasitic Nematodes. (2-3). Credit 3. I**

The morphology, identification, and biology of plant parasitic nematodes; the damage they cause; methods of control. Non-plant-pathogenic nematodes commonly found in the soil will be studied also. Prerequisite: Approval of the instructor.

**622. Plant Nematology. (1-6). Credit 3. II**

Advanced study of the principal groups of plant parasitic nematodes, with emphasis on methods used in research. Prerequisite: Plant Physiology and Pathology 621. (Offered in 1960-61 and in alternate years thereafter.)

**623. Diseases of Field Crops. (2-3). Credit 3. I**

An intensive study of both the fundamental and the practical aspects of the more important and representative diseases of field crops. The plant disease problems peculiar to extensive cultivation methods will be stressed. Prerequisite: Plant Physiology and Pathology 301.

**624. Diseases of Fruits, Vegetables, and Ornamentals. (2-3). Credit 3. II**

Identification and control of the important diseases of fruit, vegetable, and ornamental crops in Texas. Consideration will also be given to diseases of major berry crops and pecans. Various diseases and types of decay affecting products in shipment and storage will be studied. Each student will be required to carry out an inoculation-isolation exercise employing a bacterial or fungus pathogen. A virus inoculation exercise will be done by students working in pairs. Prerequisite: Plant Physiology and Pathology 301. (Offered in 1961-62 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Reports and discussions of topics of current interest in plant physiology and plant pathology, including reviews of literature on selected subjects.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Individual problems or research not pertaining to a thesis or dissertation. Prerequisite: Plant Physiology and Pathology 314 or the equivalent (for physiology), 301 or the equivalent (for pathology).

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigations in support of thesis or dissertation.

**Biochemistry and Nutrition 601. Biochemistry of Plants. (3-0). Credit 3. I**

See Department of Biochemistry and Nutrition for a full description of this course.

## Department of Poultry Science

Professor J. H. Quisenberry,
Professors J. R. Couch, W. F. Krueger, E. D. Parnell; Associate Professor
T. M. Ferguson; Assistant Professors R. L. Atkinson, R. E. Davies,
R. C. Fanguy, F. A. Gardner, C. B. Ryan

**201. Poultry Production. (2-2). Credit 3. I, II**

The breeds and types of poultry, culling poultry for egg production, incubation, brooding and feeding for growth and egg production, winter and summer management, housing and hygiene, preparing poultry for market, methods of marketing, practical application of these subjects to farm conditions. The practice consists of the identification of breeds and varieties, judging poultry for egg production, plans for poultry farms and poultry houses, identification of feeds, and formulation of poultry rations.

**303. Turkey Production. (2-0). Credit 2. II**

Varieties of turkeys; breeding practices; management and feeding; incubation practices; management of poults from hatching to market; special turkey marketing practices; sanitation and disease prevention with special reference to turkeys.

**308. Hatchery Management. (2-3). Credit 3. II**

Commercial hatching in America, early commercial hatcheries, expansion, types of hatchery enterprise, related activities, localization of hatchery business, how and where to start, hatchery building, inside arrangement, ventilation, heat and temperature control, hatchery equipment, types of incubators; hatchery flock improvement, study of the National Poultry and Turkey Improvement Plans, sanitation, incubation practices, prices and hatchery costs. Trends in size of hatcheries and causes. Practice consists of culling and blood testing hatchery flocks, setting eggs in incubator, fumigating and disinfecting incubator, candling hatching eggs, pedigreeing and judging baby chicks.

**309. Broiler Production. (2-2). Credit 3. I**

A study of modern commercial broiler production including type of birds required for successful broiler operation; the importance of such factors as color of plumage, body conformation, rate of growth, feathering, livability, uniformity, and feed efficiency; housing and equipment requirements for brooding, advantages of different brooding and management systems; disease hazards; a study of cost factors such as feed, chick, labor, medication, and overhead; methods of marketing broilers; methods of financing broiler operations; integration in the broiler industry. Practice involves the design, setting up and conducting broiler tests for evaluation of modern strains, feeds, and management practices. At the end of the tests the birds will be graded, dressed, and production costs calculated.

**401. Management and Selection. (1-2). Credit 2. II** †

How to select breeding males and females; culling the farm flock; planning a poultry program for a community with emphasis on good management and soundness of health; how to plan and manage county poultry shows. A thorough study of the National Poultry Improvement Plans, with enough practice work in selecting and testing to qualify students for official Plan participation.

**403. Judging. (2-2). Credit 3. I**

The judging of standard breeds and varieties; special instructions for judges; methods of fitting and showing birds; types of shows and show management; a study of standard disqualifications and their application to various selection standards; grading of live and dressed market poultry, and of market eggs. Practice work consists of judging classes for production and for market quality. Several small poultry shows will be judged, and visits made to egg and poultry processing plants and farms of poultry breeders.

**407. Technology and Marketing of Poultry and Poultry Products. (2-2). Credit 3. I**

A study of the U.S.D.A. grades of eggs, and of live and dressed poultry; preparing poultry for market—killing, dressing, chilling, and packaging; candling; grading, and packing shell eggs; drying and freezing eggs; storage problems and techniques with special emphasis on maintenance of quality during storage; planning poultry and egg plant layouts with special emphasis on meeting U.S.D.A. requirements for sanitation; a study of commercial egg and poultry plants and their operation; newer developments in packaging and merchandising poultry and eggs; effects of feed upon quality and quality retention; a careful study of regulations governing the grading and inspection of poultry of the U. S. Department of Agriculture, with special emphasis on inspection for wholesomeness.

**411. Poultry Feeding. (3-2). Credit 4. I** †

The history of poultry nutrition, a short study of the chemical composition of carbohydrates, proteins, fats, vitamins, and mineral mixtures as found in poultry feeds. Composition, functions, sources, and care of vitamins commonly required for efficient poultry feeding. A study of the nutritive value of the different grains, roughages, mill feeds, and protein concentrates used in poultry nutrition. Practice work in the analysis of feedstuffs, the formulation of poultry rations, and diagnosis of lack of essentials in poultry rations. Prerequisites: Chemistry 223, 231.

**414. Poultry Breeding. (2-2). Credit 3. I** †

The basic principles of poultry breeding. The inheritance of characters of economic importance. The records essential for a sound breeding program; the selection of breeders on the basis of records and standard bred characteristics. Practice includes taking records on the breeding birds, interpreting the records, and the techniques involved in pedigree breeding. Prerequisite: Genetics 301.

**481. Poultry Seminar. (1-0). Credit 1. I**

Extensive review of the literature on poultry problems. The student will be required to prepare and present to the class comprehensive reviews of the literature on various phases of poultry science. Each student will be assigned a certain number of technical journals for current reporting to the seminar group. Prerequisite: Senior classification.

**482. Poultry Seminar. (1-0). Credit 1. II**

Continuation of Poultry Science 481.

**485. Problems. Credit 1 to 4 each semester. I, II, S**

A directed study of a selected problem not covered by other courses in the Department of Poultry Science. The content of the course would be adapted to the interest and needs of the students. Prerequisite: Approval of Head of Department.

## FOR GRADUATES

**603. Principles and Practices of Incubation. (3-3). Credit 4. II**

A study of the developmental stages of the chick during incubation. Correlation of development with genetic and environmental factors. Study of the fundamental principles underlying successful artificial incubation of eggs. Relation of egg characters to hatchability. Effects of pre-incubation treatment on hatchability of chicken and turkey eggs. Control of disease during the incubation process. Relation of maternal diet to embryonic development and hatchability of the chick. Prerequisite: Poultry Science 308 or equivalent.

**604. Principles of Brooding and Rearing. (3-3). Credit 4. I**

A study of principles involved in brooding poultry. Relative cost and efficiency of different brooding and rearing methods. Relation of brooding practice to growth, livability, and subsequent adult performance. Such factors as diet, levels of protein, minerals, vitamins, medicants and growth stimulants are analyzed in relation to growth, livability, malformations, and feed efficiency. Physiological factors such as temperature control mechanisms and hormones are covered. Research methodology and thorough literature review are stressed. Prerequisites: Poultry Science 201 and 303 or equivalent.

**609. Avian Physiology. (3-3). Credit 4. I**

A study of basic physiological principles pertaining specifically to the avian species. The chicken will be used as the laboratory animal. The vascular, digestive, neural, respiratory and reproductive systems will be stressed. Prerequisites: Biology 433; approval of instructor.

**611. Poultry Processing, Storing, and Distribution. (3-0). Credit 3. II**

A study of egg quality and of egg quality maintenance. Effects of storage on egg and meat quality. The latest methods of processing eggs and poultry; feeding of market birds to improve grade; costs of production for various areas, and for various sized flocks and methods of management; planning optimum sized units for economical production. Prerequisites: Agricultural Economics 314 or equivalent; Poultry Science 407 or the equivalent.

**612. Laboratory Problems in Poultry Processing, Storing, and Distribution. (0-3). Credit 1. II**

A survey of improved methods of processing poultry and eggs. Certain selected modern processing plants will be visited and a study made of operating methods. Students may assist with experimental work in progress on poultry and egg processing and storage. Laboratory comparisons of various methods of fattening and their effects on market and storage quality of fowl. Effects of temperature and methods of dressing on market and storage quality. Prerequisite: Poultry Science 611 or registration therein.

**613. Breeding and Genetics of Poultry. (3-3). Credit 4. II**

An advanced and specialized study of poultry breeding and genetics covering such areas as causation, interrelations among traits, effective size of populations, methods of measuring genetic improvement, the heterosis concept, measures of general and specific combinability, and genetic homeostasis. Efficiency of various systems of breeding poultry will be analyzed. Scientific journals and technical literature will be reviewed. Prerequisites: Genetics 301 and Poultry Science 414 or the equivalent.

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Intensive review and reporting of literature on poultry feeding, breeding, incubation, marketing, and management problems. Development of familiarity not only with literature but with organizations, agencies, and personnel working with poultry problems. Prerequisite: Graduate classification. May be repeated as many semesters as desired but maximum of two credits allowed toward Master's degree.

**685. Problems. Credit 1 to 6 each semester. I, II, S**

An intensive study of newer principles and methods in the various specialized fields of poultry science—breeding, nutrition, market technology. Prerequisite: Approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Intensive study of research methods and techniques in poultry breeding, nutrition, physiology, physical aspects of marketing, or poultry products technology. Students will be required to carry out some experimental projects in one of these fields. Reviews of specific literature, collection, analysis, and presentation of experimental data will be stressed. Designed for thesis and dissertation credit.

## Department of Range and Forestry

Professor C. L. Leinweber,
Professors R. A. Darrow, O. E. Sperry; Associate Professors F. W. Gould, W. G. McCully, R. R. Rhodes; Assistant Professors D. L. Huss, W. J. Waldrip

**102. Introduction to Range and Forestry. (1-0). Credit 1. II**

A brief survey of the fields of forestry and range management including the history, resources, policies, organization, industries, employment, education and research pertaining to the respective professions. One field trip into the forest is required.

**202. Range Plants. (2-3). Credit 3. I**

Native forage plants of the ranges of the United States. Determination, distribution, ecology, and economic value, especially in Texas are considered. Poisonous plants and range practices to avoid livestock losses are included. Prerequisite: Biology 102 or the equivalent.

**203. Dendrology. (1-3). Credit 2. I**

The identification, classification, group silvical characteristics, distribution, and values of the important trees and shrubs of the coniferous group (Gymnosperms). Field trips arranged. Prerequisite: Biology 102.

**204. Dendrology. (2-3). Credit 3. II**

The identification, classification, group silvical characteristics, distribution, and values of the important trees of the hardwood group (Angiosperms); as well as the shrubs and other woody plants associated with woodlands and commercial forests. Field trips arranged. Prerequisite: Biology 102.

**301. Plant and Range Ecology. (2-3). Credit 3. II** †

An analysis of habitat factors as they influence plant growth. Attention is given plant succession, competition and distribution of plants in relation to the environment. Prerequisite: Biology 102.

**303. Agrostology. (2-3). Credit 3. I** †

A fundamental study of grasses, especially those of economic importance in Texas. A study of the characteristics of the various genera and species of grasses, their identification, distribution, propagation, improvement, and management with particular reference to their use and value in Texas ranges and pastures. Prerequisite: Biology 102 or equivalent.

**304. Range Management. (2-3). Credit 3. I** †

A technical course dealing with problems met in managing native range lands, including a study of grazing regions, and the problems of each; revegetation of range lands; maintenance of production; utilization of range forage; and range livestock management as it affects vegetation. Field trips. Prerequisites: Range and Forestry 301, 303.

**308. Forest Management. (2-3). Credit 3. II**

A study of the principles and problems involved in the management of forest stands for multiple use of timber, forage, wildlife, and watershed protection; the application of tree and log measurements to the principal forest products; and the preservation of wood products for farm and ranch use. Field trips.

**309. Silvics and Silviculture. (2-3). Credit 3. I**

A study of the factors of site, their influence on tree growth and reciprocal effect on site; silvicultural cutting systems, cultural operations, and the silvicultural characteristics of the more important commercial species of the South and Southwest. Field trips. Prerequisite: Range and Forestry 308.

**310. Forest Products and Utilization. (2-2). Credit 3. II**

Utilization of the products of farm woodlots, woodlands and commercial forests; the manufacture and utilization of lumber, timber, and other wooden products, including mechanical properties, and lumber grades. Also the identification of certain woods important in agricultural and commercial enterprises of the South and Southwest. Field trips.

**401. Range Improvement and Maintenance. (2-3). Credit 3. I, II**

A general course for students not majoring in range management. Native forage and poisonous plants on the ranges of Texas. Evaluation and analysis of range lands, grazing systems, livestock handling problems, physiology of plant responses to grazing and range management, range condition classification. Field trips.

**409. Advanced Range Management. (2-3). Credit 3. II** †

A technical course dealing with the more advanced problems in managing native range lands. Special attention will be given to the study of the development of the range industry, cost of production, range land utilization, grazing systems, range trend, and condition classes. Field trips. Prerequisite: Range and Forestry 304.

**411. Field Range Management. Credit 2 or 3. S** †

A semi-technical summer field course in which emphasis is placed upon identification of important range plants; determination of vegetation types, subtypes, forage utilization values, range condition classes, mapping; brush eradication and control, and proper distribution of livestock. A summer field course primarily for county agricultural agents and vocational agricultural teachers, others by approval of instructor.

**412. Range Management Practices. (2-3). Credit 3. I, II**

Livestock management as related to utilization of range lands; range and ranch management planning; evaluation and survey of forage resource; economic principles associated with range livestock management. Prerequisite: Range and Forestry 304 or 401.

**485. Range Problems. Credit 1 to 3 each semester. I, II, S** †

Individual study and research upon a selected range problem approved by instructor.

## FOR GRADUATES

**605. Range Research Methods. Credit 2. I**

A study of research methods in range management and related subjects. A review of scientific investigation in the field and analysis of results. Prerequisite: Graduate majors in range and forestry.

**606. Range Economics. (2-0). Credit 2. II**

Range management practices, land utilization, and ranch operation as they affect economics of livestock industry and the nation. Prerequisite: Graduate majors and minors in range and forestry.

**607. Vegetation Influences. (3-0). Credit 3. I**

Interrelationships between ecological factors and vegetation, influence of forest and range vegetation on watershed management and soil conservation. Prerequisite: Range and Forestry 301. (Offered in 1961-62 and in alternate years thereafter.)

**609. Plant and Range Ecology. (3-0). Credit 3. I**

A detailed study of plant communities, successions, and the effect of various degrees of utilization in vegetation types and edaphic factors. Prerequisite: Range and Forestry 301 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**610. Range Grasses and Grasslands. (2-3). Credit 3. II**

A study of range grasses as applied to utilization and sustained production. The ecological characteristics and geographical features of the native grasslands. Ecological principles as applied to range problems. Individual problems to be assigned. Prerequisites: Range and Forestry 301, 303; approval of Head of Department.

**611. Control of Noxious Range Plants. (3-0). Credit 3. II**

An advanced study of native and naturalized noxious and poisonous plants on Texas ranges that are detrimental to good management practices. Their distribution, reproduction, dissemination, and methods and practices of control will be stressed in relation to conservation and economic importance. Field trips to be arranged. (Offered in 1960-61 and in alternate years thereafter.)

**612. Range Management Practices, Policies, and Administration. (3-0). Credit 3. I**

Advanced studies dealing with technical range management problems, social and economic background of legislation, and policies developed in the acquisition and administration of national, state, and private range properties. Field trips to be arranged. Prerequisite: Range and Forestry 409 or equivalent. (Offered in 1961-62 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Current scientific work in range management and related subjects in American and foreign fields. Prerequisite: Majors and minors in range and forestry.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

A course designed for investigations not included in the student's research for thesis or dissertation. Problems may be selected in applied ecology, range management, or forestry. Lectures, conferences, field work, reports. Prerequisite: Graduate majors or minors in range and forestry.

**691. Research. Credit 1 or more each semester. I, II, S**

Research for thesis or dissertation. Prerequisite: Graduate major in range and forestry.

## Religious Education

(See page 88)

## Department of Veterinary Anatomy

Professor J. H. Milliff;
Associate Professors L. W. Gibbs, A. G. Kemler; Instructor R. G. Greeley

**202. Veterinary Anatomy. (1-6). Credit 3. II**

Osteology of the horse and cow. Topographical dissection of the cow. Histology of the tissues and organs of the cow. Prerequisite: Biology 107 or the equivalent.

**301. Anatomy. (0-9). Credit 3. I** ‡

The osteology, dentition, and arthrology of the domestic animals and topographical dissection of the dog.

**302. Anatomy. (0-9). Credit 3. II** ‡

Topographical dissection of the cow and a comparative study of the horse, cat, and pig. Prerequisite: Veterinary Anatomy 301.

**303. Histology. (2-6). Credit 4. I** ‡

A microscopic study of the basic tissues and of the organs, excluding the organs of reproduction.

**304. Embryology. (3-3). Credit 4. II** ‡

A microscopic study of the reproductive organs of the domestic animals, and of serial sections of chick and pig embryos. Prerequisites: Veterinary Anatomy 301, 303.

**306. Neuroanatomy. (0-6). Credit 2. II** ‡

Gross, developmental, and microscopic anatomy of the nervous system. Prerequisite: Veterinary Anatomy 303.

**501. Surgical Anatomy. (0-6). Credit 2. I** †

The anatomy of the areas of surgical and clinical importance in the domestic animals. Prerequisite: Veterinary Anatomy 302.

### FOR GRADUATES

**601. Veterinary Anatomy. (1-9). Credit 4 each semester. I, II**

The topographical dissection of domestic animals. Prerequisites: Veterinary Anatomy 301, 302.

**602. Veterinary Anatomy. (2-6). Credit 4. I, II**

The microscopic structure of the anatomical systems of domestic animals. Prerequisite: Veterinary Anatomy 303.

**603. Neuroanatomy. (2-6). Credit 4. II**

The study of the gross, developmental, and microscopic anatomy of the nervous systems of the domestic animals. Prerequisite: Veterinary Anatomy 306.

**604. History of Anatomy. (1-0). Credit 1. I, II, S**

A dicussion of the biographies and contributions to the field of anatomy of the most important anatomists from 500 B.C. to the present. Prerequisite: Graduate major in veterinary anatomy.

**681. Seminar. (1-0). Credit 1. S**

The review and discussion of current scientific work in anatomy and related subjects. Prerequisite: Graduate major or minor in veterinary anatomy.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**685. Problems. Credit 1 to 4 each semester. I, II S**

Problems in either gross or microscopic anatomy along lines to be chosen by the individual. Prerequisites: Veterinary Anatomy 306; approval of the Head of the Department.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on a selected thesis problem in anatomy. Prerequisite: Graduate major in veterinary anatomy.

## Department of Veterinary Medicine and Surgery

Professor M. R. Calliham,
Professors W. C. Banks, H. E. Redmond; Associate Professors J. C. Ramge, W. M. Romane; Assistant Professors B. M. Cooley, J. H. Denton, E. W. Ellett; Instructors G. M. Gowing, H. B. Naylor, R. S. Titus, M. F. Young;
Lecturer A. A. Price

**416. General Surgery. (1-0). Credit 1. II**

Principles of unsoundnesses and horseshoeing. Prerequisite: Veterinary Anatomy 302.

**511. Non-Infectious Diseases of Large Animals. (3-0). Credit 3. I**

Lectures and demonstrations on physical diagnosis; diseases of the digestive, circulatory, respiratory, urinary organs; nervous system; and the skin of large animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**512. Radiology. (2-0). Credit 2. II**

Fundamentals of veterinary radiography, fluoroscopy, x-ray and radioisotope therapy with interpretation of radiographs and fluoroscopic examinations and essential protection from radiation. Prerequisites: Veterinary Microbiology 436; Veterinary Pathology 444.

**513. Non-Infectious Diseases of Small Animals. (3-0). Credit 3. I**

Non-infectious and nutritional diseases, obstetrics, pediatrics, and geriatrics of small animals, fur-bearing animals, and laboratory animals. Prerequisites: Veterinary Pathology 444; Veterinary Physiology and Pharmacology 529 or registration therein.

**514. Infectious Diseases of Small Animals. (2-0). Credit 2. II**

A study of the bacterial, rickettsial, viral, and protozoan diseases of small animals. Prerequisite: Veterinary Medicine and Surgery 513.

**515. General Surgery. (4-0). Credit 4. I**

The principles of dentistry, surgery, and anesthesia of domestic animals. Prerequisites: Veterinary Pathology 444; Veterinary Medicine and Surgery 416.

**516. Operative Surgery of Large Animals. (2-2). Credit 3. II**

Surgical diseases and special surgery of large animals. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**519. Clinics. (0-4). Credit 1. I**

Clinical orientation, restraint, administration of medicine, physical examination, methods of collecting specimens for laboratory purposes. Prerequisites: Veterinary Medicine and Surgery 513 and 515 or registration therein.

**520. Clinical Seminar. (0-4). Credit 1. II**

Presentation and discussion of clinical cases. Prerequisite: Veterinary Medicine and Surgery 519.

**521. Reproductive Diseases. (2-0). Credit 2. II**

A consideration of prevention and treatment of diseases incident to or affecting breeding, conception, gestation, parturition, and postparturient convalescence of common domestic animals; prevention and treatment of diseases of the newborn. Prerequisite: Veterinary Medicine and Surgery 526.

**524. Operative Surgery of Small Animals. (1-2). Credit 2. II**

Surgical procedures in small animals, including orthopedics. Surgical exercises are required. Prerequisite: Veterinary Medicine and Surgery 515.

**526. Obstetrics. (2-0). Credit 2. I**

Castration and spaying of farm animals, physiology of parturition, mechanics of obstetrical operations; theory and technique of artificial insemination. Prerequisite: Veterinary Physiology and Pharmacology 529 or registration therein.

**561. Clinical Laboratory Diagnosis. (0-2). Credit 1. I** †

Instruction in routine laboratory procedures including hematology, urine analysis, radiography, and radiation therapy. Prerequisites: Veterinary Medicine and Surgery 520; Veterinary Microbiology 436.

**562. Clinical Laboratory Diagnosis. (0-2). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 561. Prerequisite: Veterinary Medicine and Surgery 561.

**563. Ambulatory Clinic. (0-4). Credit 1. I**

Under the supervision of an instructor, students are taken on calls to private farms or College herds for training and experience in the diagnosis and treatment of animal diseases under actual farm and ranch conditions. Prerequisite: Veterinary Medicine and Surgery 520.

**564. Ambulatory Clinic. (0-4). Credit 1. II**

Continuation of Veterinary Medicine and Surgery 563. Prerequisite: Veterinary Medicine and Surgery 563.

**565. Large Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. All species of large animals are utilized. Lectures on hospital management and large animal practice and promotion are included. Prerequisite: Veterinary Medicine and Surgery 520.

**566. Large Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 565. Prerequisite: Veterinary Medicine and Surgery 565.

**567. Small Animal Clinic. (1-7). Credit 3. I**

Students are required to assume full responsibility for the diagnosis, care, and treatment of patients assigned under the supervision of instructors. Detailed studies of hospital planning, practice management, and promotion and veterinary ethics are included. Prerequisite: Veterinary Medicine and Surgery 520.

**568. Small Animal Clinic. (0-7). Credit 2. II**

Continuation of Veterinary Medicine and Surgery 567. Prerequisite: Veterinary Medicine and Surgery 567.

**569. Veterinary Clinics. (0-6). Credit 2. S**

Veterinary clinics. Prerequisite: Veterinary Medicine and Surgery 520.

## FOR GRADUATES

**603. Veterinary Surgery. Credit 1 to 8 each semester. I, II**

Special surgery of large or small animals. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**612. Diagnostic Radiology. Credit 2 or 3 each semester. I, II, S**

Radiographic interpretation of large and small animals with special emphasis on film reading. The use of special techniques including contrast media as diagnostic aids will be discussed and demonstrated. Prerequisite: Degree of Doctor of Veterinary Medicine.

**685. Problems. Credit 1 to 8 each semester. I, II**

Original investigations of problems in the field of surgery, therapeutics, or radiology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II**

Research for thesis.

## Department of Veterinary Microbiology

Professor L. C. Grumbles;
Associate Professors A. I. Flowers, C. F. Hall, P. F. Jungerman;
Assistant Professor R. W. Moore

**301. Microorganisms in Animal Diseases. (1-4). Credit 2. I**

A study of the function of microorganisms in maintaining health and causing diseases in domestic animals. Rumen microflora. Preservation and spoilage of meat. Methods by which infectious diseases are transmitted and prevented. A study of selected groups of pathogens and specific diseases. Prerequisite: Biology 206.

**334. Poultry Diseases. (2-2). Credit 3. II**

Poultry sanitation and diseases. Prevention and control of environmental, nutritional, parasitic, and contagious diseases. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323.

**435. Microbiology and Immunology. (3-4). Credit 4. I** ‡

The principles of microbiology and immunology. Emphasis is placed on the general morphology, physiology, and immunologic reactions of microorganisms important in veterinary medicine. Special attention is given to the biologics in the diagnosis and treatment of infectious diseases. Prerequisite: Second year classification in veterinary medicine.

**436. Pathogenic Microbiology. (3-3). Credit 4. II** ‡

A study of the general staining procedures, cultural methods and media preparation for bacteria; and the morphology, cultural characteristics, and pathogenicity of microorganisms which produce diseases in domestic animals and man. Prerequisite: Veterinary Microbiology 435.

**485. Problems. Credit 1 to 3. I, II, S**

A directed, individual study of a selected problem in veterinary microbiology approved by the instructor. Prerequisite: Approval of the Head of the Department.

**595. Poultry Diseases. (2-2). Credit 3. I**

The pathology of diseases of poultry will be considered from clinical, pathological, microbiological, and parasitological standpoints. Prevention, control, and treatment will also be given consideration. Prerequisite: Senior classification in veterinary medicine.

**596. Poultry Diagnosis. (0-2). Credit 1. II**

Clinical laboratory diagnosis of poultry diseases. Prerequisite: Veterinary Microbiology 595.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

### FOR GRADUATES

**643. Veterinary Microbiology. (3-4). Credit 4. I, II**

A study of the pathogenic microorganisms; their cultural and biological characteristics and pathogenicity.

**646. Avian Virus Diseases. Credit 1 to 4. I, II**

A study of the viral diseases of poultry including methods of isolation and identification of the causative agents. Practice consists of conducting post mortem examinations and special diagnostic procedures on birds received daily for necropsy. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**647. Veterinary Virology. Credit 1 to 4. I, II**

A detailed study of virus infections in animals, including types of infections, mode of transmission, intracellular pathology, epidemiology, isolation and identification of the inciting agents. Practice includes tissue cultivation, animal inoculations, and diagnostic tests. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Veterinary Mycology. Credit 1 to 4. II, S**

A study of actinomycetes, yeasts, and molds that are pathogenic to man and animals; the morphology, cultural characteristics, pathogenicity and identification. Practice consists of exercises in cultural methods, morphological characteristics, biochemical reactions and diagnosis. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in microbiology. Prerequisite: Degree of Doctor of Veterinary Medicine. (May be taken for undergraduate credit with permission of the Head of the Department.)

**691. Research. Credit 1 to 8. I, II**

An original problem in veterinary microbiology. This research to be reported by a thesis as partial requirement for the Master of Science degree. Prerequisite: Admission to candidacy for Master of Science degree.

## Department of Veterinary Parasitology

Professor R. D. Turk;
Associate Professor R. R. Bell; Assistant Professor T. J. Galvin

**483. Parasites of Domestic Animals. (2-2). Credit 3. I** ‡

Internal parasites of domestic animals. Symptoms, diagnosis, treatment, control, and eradication of parasitic diseases are emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized. Prerequisite: Veterinary Anatomy 302.

**484. Parasites of Domestic Animals. (2-2). Credit 3. II** ‡

Internal parasites of farm, pet, and fur-bearing animals. Attention is given to symptoms, diagnosis, treatment, control, and eradication of parasitic diseases. Practice consists of laboratory and diagnostic methods used in parasitology; the pathology of parasitism. Fresh and preserved material obtained from the field, clinics, and necropsies are utilized in the laboratory. Prerequisite: Veterinary Parasitology 483.

**487. Parasites of Farm Animals and Poultry. (2-2). Credit 3. II, S** †

A study of some of the more important internal and external parasites of domestic animals and poultry. The life cycles, pathogenicity, and economic and public health aspects will be stressed with suggested methods for control. Open to agricultural students. Prerequisite: Senior classification.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**583. Clinical Parasitology. (0-2). Credit 1. I**
Diagnosis of parasitic diseases is emphasized. Practice consists of laboratory and diagnostic methods used in parasitology. Prerequisite: Veterinary Parasitology 484.

**584. Clinical Parasitology. (0-2). Credit 1. II**
Diagnosis of parasitic diseases including physical examination of patients and such laboratory procedures as are indicated. Prerequisite: Veterinary Medicine and Surgery 519.

### FOR GRADUATES

**601. Parasitology. Credit 1 to 4 each semester. I**
A detailed study of the more important helminth parasites of domestic animals, including their identification, distribution, and life history. Prerequisite: Veterinary Parasitology 584 or the equivalent.

**685. Problems. Credit 1 to 4 each semester. I, II, S**
Special problems concerned with the parasites of domestic animals or poultry. Prerequisites: Veterinary Parasitology 601 or the equivalent; approval of the instructor.

**691. Research. Credit 1 or more each semester. I, II, S**
Research for thesis.

## Department of Veterinary Pathology

Professor C. H. Bridges*,
Professors I. B. Boughton, H. A. Smith**; Associate Professor J. N. Beasley;
Assistant Professor W. F. Mestanza; Instructor F. A. Fear

**443. General Pathology. (4-3). Credit 5. I**
The elementary disease processes and their causes, including a study of the gross and minute appearance of the diseased tissue. Such processes as inflammation, necrosis, gangrene, atrophy, hypertrophy, ulceration, the various degenerations, infiltrations, pigmentations, and tumor formations are considered. Practice consists of the microscopic study of these processes and instruction in laboratory technique. Prerequisites: Veterinary Anatomy 302, 304.

**444. Special Pathology. (5-3). Credit 6. II**
Lectures on special pathology of organs and systems. Infectious and noninfectious diseases are considered. The mechanism of development of lesions and their relationship to clinical symptoms are emphasized. Lectures are illustrated liberally with color slides. Laboratory work consists of studies in gross and microscopic pathology. Prerequisite: Veterinary Pathology 443.

**447. General Principles of Pathology. (2-2). Credit 3. I, S** †
A study of the mechanisms of disease as encountered in the higher mammalian species. The course deals with the causes and pathogenesis of the various types of disease, the reactions of the body against them, and certain abstract principles governing their treatment. Open to non-medical students. Lectures and demonstrations. Prerequisites: Six hours of biological sciences; junior classification.

**577. Applied Pathology. (0-2). Credit 1. I**
Pathology as directly applied to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

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*Became Head of Department effective October 16, 1960.
**Retired effective October 16, 1960.

**578. Applied Pathology. (0-2). Credit 1. II**

Pathology as applied directly to clinical cases and problems, including necropsies. Prerequisite: Veterinary Pathology 444.

**585. Problems in Pathology. Credit 1 to 4 each semester. I, II, S**

An elective course for undergraduates who wish to supplement the standard required courses. Problems can be assigned in gross or microscopic pathology or in pathological technique. Prerequisites: Veterinary Pathology 443; approval of the instructor.

## FOR GRADUATES

**643. Gross Pathology. Credit 1 to 6. I, II, S**

The student studies gross pathological changes at the necropsies performed daily. He then follows selected tissues through suitable histopathological techniques and corrects his gross diagnoses in the light of the microscopic findings. Confirmatory bacteriologic methods are utilized where indicated. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**644. Locomotor and Skeletal Diseases. Credit 1 or 2. I, S**

The changes taking place in diseased bones, joints, and muscles are studied with respect to their nature and probable causes, and with special reference to lameness of the horse. Frequent use is made of the unsurpassed Mark Francis Collection of Bone and Joint Pathology. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**645. Neoplastic Diseases. Credit 1 to 8. I, II, S**

Theoretical, histopathological, and clinical aspects of neoplasms. Diagnosis of neoplastic and related conditions in all species. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**646. Nutritional Diseases. Credit 2 to 4. II**

Gross and microscopic tissue changes to be found in experimentally produced nutritional deficiencies are considered in comparison with clinically encountered deficiencies and with other conditions from which they must be differentiated. Prerequisite: Degree of Doctor of Veterinary Medicine or other suitable preparation.

**647. Metabolic Diseases. Credit 1 or 2. S**

The pathology of diseases due to major disorders of metabolism, non-nutritional and non-infectious. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**648. Reproductive Diseases. Credit 1 to 4. S**

Theoretical and practical pathology of gross and microscopic lesions in the reproductive organs with especial reference to bovine sterility. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**649. Gross Post-Mortem Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in recognition, interpretation, and description of tissue changes encountered. Specific diagnoses are derived and defended. Prerequisites: At least 4 semester hours of credit in Veterinary Pathology 643.

**650. Neuropathology of Animals. Credit 1 to 4. I, S**

In addition to the study and interpretation of gross and microscopic lesions of the central and peripheral nervous systems, major attention is given in theory and in practice to the special laboratory techniques necessary to demonstrate such lesions. Prerequisite: Degree of Doctor of Veterinary Medicine or equivalent.

**651. Microscopic Diagnosis. Credit 1 to 6. I, II, S**

Advanced training in diagnosis, applied especially to the "problem" cases currently encountered in the Department's pathological diagnostic service. Routine and special histopathological methods are employed. Prerequisites: A total of at least 10 semester hours of credit in Veterinary Pathology 643, 645.

**658. Pathological Technique. Credit 1 to 6. I, II, S**

The art and science of preparing animal tissues, fluids, and exudates for microscopic or other special examination. Enrollment is limited to the number who can be accommodated in the routine of the departmental laboratory. Prerequisite: A fair knowledge of general chemistry.

**659. Sheep Diseases. Credit 1 to 4. I**

The pathology, etiology, and symptomatology of the economically important diseases affecting sheep in all of the major sheep-producing countries of the world. Prerequisite: Degree of Doctor of Veterinary Medicine or the equivalent.

**691. Research. Credit 1 or more each semester. I, II, S**

Research to be reported by the writing of a thesis or dissertation as a partial requirement for the Master of Science or Doctor of Philosophy degree.

## Department of Veterinary Physiology and Pharmacology

Professor P. W. Burns;
Associate Professor R. H. Davis, Jr.; Assistant Professor J. D. McCrady

**323. Physiology of Farm Animals. (2-2). Credit 3. I, II**

A consideration of physiology and anatomy essential to an understanding of diseases of farm animals. For students in agriculture. Prerequisite: Chemistry 231.

**326. Physiology. (4-3). Credit 5. II** ‡

Introduction to physiology. Dynamics of nerve and muscle. Functions of the circulatory and respiratory systems. Renal function and body fluids. Mechanisms of digestion, absorption, and excretion. Prerequisites: Biochemistry and Nutrition 312; Veterinary Anatomy 301, 303, registration in 302, 304, 306.

**427. Physiology. (2-6). Credit 4. I** ‡

Metabolism and energy exchange. Minerals and vitamins. Functions of the nervous, endocrine, and reproductive systems. Milk secretion and growth. Prerequisite: Veterinary Physiology and Pharmacology 326.

**428. Pharmacology. (3-0). Credit 3. II**

Pharmacologic principles; central nervous system depressants and stimulants; local anesthetics; autonomic drugs; skeletal muscle relaxants; antihistamines. Prerequisite: Veterinary Physiology and Pharmacology 427.

**529. Pharmacology. (2-3). Credit 3. I**

Cardiovascular drugs; hematologic agents; diuretics; locally acting drugs; gastrointestinal agents; drugs used in metabolic disorders, hormones; local and systemic anti-infectives; parasiticides. Practice consists of the study of the action of drugs on experimental animals. Prerequisite: Veterinary Physiology and Pharmacology 428.

**530. Toxicology. (2-2). Credit 3. II**

Occurrence, symptoms, lesions, treatment, prevention, and management of poisoning by inorganic and organic poisons. Clinical manifestations, lesions and management of animals affected by poisonous plants. Practice consists of actions and treatment of poisons in experimental animals; chemical detection of some of the more common inorganic and organic poisons. Prerequisite: Veterinary Physiology and Pharmacology 529.

**573. Pharmacy. (0-2). Credit 1. I**

Principles of pharmacy; preparing, compounding, and dispensing medicines. Prerequisite: Veterinary Physiology and Pharmacology 529.

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‡May be taken for graduate credit by students not majoring in veterinary medicine.

**574. Pharmacy. (0-2). Credit 1. II**

A continuation of Veterinary Physiology and Pharmacology 573. Prerequisite: Veterinary Physiology and Pharmacology 573.

### FOR GRADUATES

**601, 602. Animal Physiology. (3-3). Credit 4 each semester. I, II**

Recent phases of physiology; modern experimental methods. The work is arranged to suit the needs of the student and in harmony with his previous training. Prerequisite: Basic courses in morphology and organic chemistry.

**605, 606. Veterinary Toxicology. (3-3). Credit 4 each semester. I, II**

Original investigations and detailed studies of poisons or poisonous plants and their effects on domestic animals. Prerequisite: Veterinary Physiology and Pharmacology 530.

**607, 608. Veterinary Pharmacology. (3-3). Credit 4 each semester. I, II**

Modern methods of research in pharmacology and pharmaceutical processes. Original research in studying the actions and uses of drugs. Prerequisites: Veterinary Physiology and Pharmacology 428, 529.

**611, 612. Veterinary Physiology. (3-3). Credit 4 each semester. I, II**

A detailed study of specific phases of physiology of domestic animals. Prerequisites: Veterinary Anatomy 303, 304; Veterinary Physiology and Pharmacology 427.

**685. Problems. Credit 1 to 4 each semester. I, II, S**

Problems in physiology, pharmacology, or toxicology. Prerequisite: Degree of Doctor of Veterinary Medicine or appropriate specialized training.

**691. Research. Credit 1 or more each semester. I, II, S**

Original investigations in veterinary physiology, pharmacology or toxicology to be submitted by writing of a thesis as partial fulfillment for the Master of Science degree. Prerequisite: Approval of Head of Department.

## Department of Veterinary Public Health

Professor F. P. Jaggi, Jr.;
Assistant Professor L. H. Russell, Jr.

**491. Animal Hygiene. (2-2). Credit 3. I, II**

This course deals with livestock sanitation and the prevention, control, and eradication of diseases of farm and ranch animals. Prerequisites: Biology 206; Veterinary Physiology and Pharmacology 323; senior classification in agriculture.

**533. Food Hygiene. (1-2). Credit 2. I**

The inspection of foods of animal origin with special emphasis on milk; laws, ordinances, and regulations governing animal food products including sanitary standards and animal health requirements. Prerequisite: Junior classification in veterinary medicine.

**536. Infectious Diseases of Large Animals. (5-0). Credit 5. II**

A study of the bacterial, rickettsial, viral, and protozoal diseases of farm and ranch animals (bovine, equine, ovine, caprine, and porcine). Public health aspects of the various intertransmissible diseases of animal and man are stressed. Prerequisite: Junior classification in veterinary medicine.

**591. Food Hygiene. (2-2). Credit 3. I**

A continuation of Veterinary Public Health 533 with special emphasis on meat. Required field trips. Prerequisite: Senior classification in veterinary medicine.

**592. Public Health. (2-2). Credit 3. II**

The relation of the veterinarian and veterinary problems to public health. Required field trips. Prerequisite: Veterinary Public Health 591.

### FOR GRADUATES

**601. Food Hygiene. (3-4). Credit 4. I**

The study of causes and evidence of spoilage, and the detection of adulterants in fresh, canned, and cured foods of animal origin. Prerequisite: Veterinary Public Health 591 or 592.

**685. Problems. Credit 1 to 4 each semester. I, II**

Problems course in veterinary public health. Prerequisite: Degree of Doctor of Veterinary Medicine.

## Department of Wildlife Management

Professor W. B. Davis;
Associate Professors R. J. Baldauf, R. B. Davis, O. C. Wallmo;
Instructor J. M. Inglis

**201. Wildlife Conservation and Management. (3-0). Credit 3. I, II**

An introduction to the wildlife and fishery resources of the United States with special reference to Texas. The importance of plants and animals in our economic and cultural life. An account of what has happened to North American wildlife with consideration of specific plans and methods for its rehabilitation, maintenance, and increase.

**202. Natural History of the Vertebrates. (2-2). Credit 3. II**

Natural history of fishes, amphibians, reptiles, birds and mammals, as exemplified by selected representatives of each group. Not open to wildlife management majors.

**300. Field Studies. Credit 3. S**

Wildlife survey of selected areas. Studies of plant-animal interrelationships, birds, mammals, and other native vertebrates; experience in collecting and preparing study skins of birds, mammals, reptiles, and amphibians. Prerequisite: Junior classification or approval of Head of Department.

**304. Conservation and Management of Fishes. (3-0). Credit 3. II**

The classification, habits, economic importance, and conservation of fishes.

**311. Ichthyology. (Fresh Water). (2-3). Credit 3. I** †

This course is designed to familiarize the student with the fresh-water fishes of the world. The approach to the subject matter will be mainly systematic, but the evolution, ecology, life history, and economy of the more important species will be treated. The fresh-water fishes of Texas will be emphasized and the practice will consist of the identification of 75-100 fish. Prerequisite: Biology 107.

**312. Ichthyology. (Marine). (2-3). Credit 3. II** †

A study of the marine fishes of the world, emphasizing fishes of Texas. Life history, ecology, distribution, evolution, and economic values of important species will be treated. Prerequisite: Biology 107. (Offered in 1961-62 and in alternate years thereafter.)

**315. Herpetology. (2-2). Credit 3. II** †

An introduction to the study of the structure, adaptation, classification, distribution, and economic importance of amphibians and reptiles. Prerequisite: Biology 107.

**316. Field Herpetology. (0-3). Credit 1. II**

Field work involving the collection and preservation of herpetological specimens; natural history; ecological relations. Prerequisites: Wildlife Management 315 or registration therein.

**400. Fisheries Survey. Credit 4. S**

A field course. Attention will be given to the life histories, ecology, and propagation of fishes important for sporting and food purposes. Distribution, identification, and field techniques. Prerequisite: Junior classification or approval of Head of Department.

**401. General Mammalogy. (2-2). Credit 3. I** †

Study of the structure, classification, and economic relations of mammals. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**402. General Ornithology. (2-2). Credit 3. II** †

Introduction to the study of birds, their structure, classification, geographic distribution, ecologic relations, and economic status. Foundation for wildlife management, also for museum work. Prerequisite: Biology 107.

**403. Animal Ecology. (2-3). Credit 3. I** †

Composition, structure, and energy relationships of plant-animal communities. The interaction of physical and biotic factors as they affect population levels and community development. Application of ecological principles to some current land use practices. Prerequisite: Range and Forestry 301.

**408. Techniques of Wildlife Management. (2-3). Credit 3. II** †

Methods and techniques in maintaining and increasing desirable wildlife and regulating population generally, with emphasis on practical aspects. Use of natural vegetation, the place and methods of census, restocking, game preserves, predatory animal control, provision of food and cover, farmer-sportsman relations, significance of succession, and other ecologic concepts to game management and related enterprises. Prerequisite: Senior classification in wildlife management or approval of instructor.

**410. Conservation and Management of Fishes. (3-0). Credit 3. II** †

Basic knowledge from ichthyology, biology of fishes, and limnology is related to the applied aspects of fresh water and marine fishery science. Emphasis is placed on methods of fish culture, habitat and population manipulation, disease and parasites of fishes and fundamentals of farm pond management.

**417. Biology of Fishes. (2-2). Credit 3. I** †

Treats the biology of fishes, including respiration, sense organs, feeding habits, breeding habits, anatomy, and adaptations to the environment. Emphasis will be placed upon the various physiological and morphological features of fishes, particularly as they relate to problems of distribution, populations, and management in Texas. Prerequisite: Biology 107. (Offered in 1961-62 and in alternate years thereafter.)

**485. Wildlife Problems. Credit 1 to 3. I, II, S**

Individual study and research on a selected problem approved by the instructor. Prerequisite: Junior or senior classification.

## FOR GRADUATES

**601, 602. Vertebrate Systematics. (1-6). Credit 3 each semester. I, II**

The theory and practice of taxonomy as applied to vertebrates. Laboratory consists of individual problems on classification and distribution of selected groups of vertebrates; problems in nomenclature of birds, mammals, fishes and reptiles, based on Texas Cooperative Wildlife Collection. Survey of the literature of vertebrate taxonomy as related to the group selected; a study of vertebrate material from the systematic standpoint. Prerequisites: Wildlife Management 311, 315, 401, or 402, depending on group selected. (Offered in 1960-61 and in alternate years thereafter.)

**603. Vertebrate Ecology. (1-6). Credit 3. II**

The ecology and life histories of vertebrates with special reference to birds and mammals. The role of native vertebrates in relation to range, forest, and farm problems. Consideration will be given to community and environmental relations. Prerequisite: Wildlife Management 403 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**608. Techniques of Wildlife Management. (2-0). Credit 2. II**

Special techniques and current development in wildlife management practices. Prerequisite: Wildlife Management 408 or equivalent. (Offered in 1960-61 and in alternate years thereafter.)

**609. Wildlife Research Methods. (2-0). Credit 2. I**

A study of research methods as applied to wildlife management. (Offered in 1960-61 and in alternate years thereafter.)

**681. Seminar. (1-0). Credit 1 each semester. I, II**

Important current developments in the wildlife field with special reference to the literature. Prerequisite: Senior or graduate classification.

**685. Problems. Credit 2 to 6 each semester. I, II, S**

Credit to be adjusted in accordance with requirements of each individual case.

**691. Research. Credit 1 or more each semester. I, II, S**

Original research on selected wildlife problem to be used in thesis or dissertation.

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